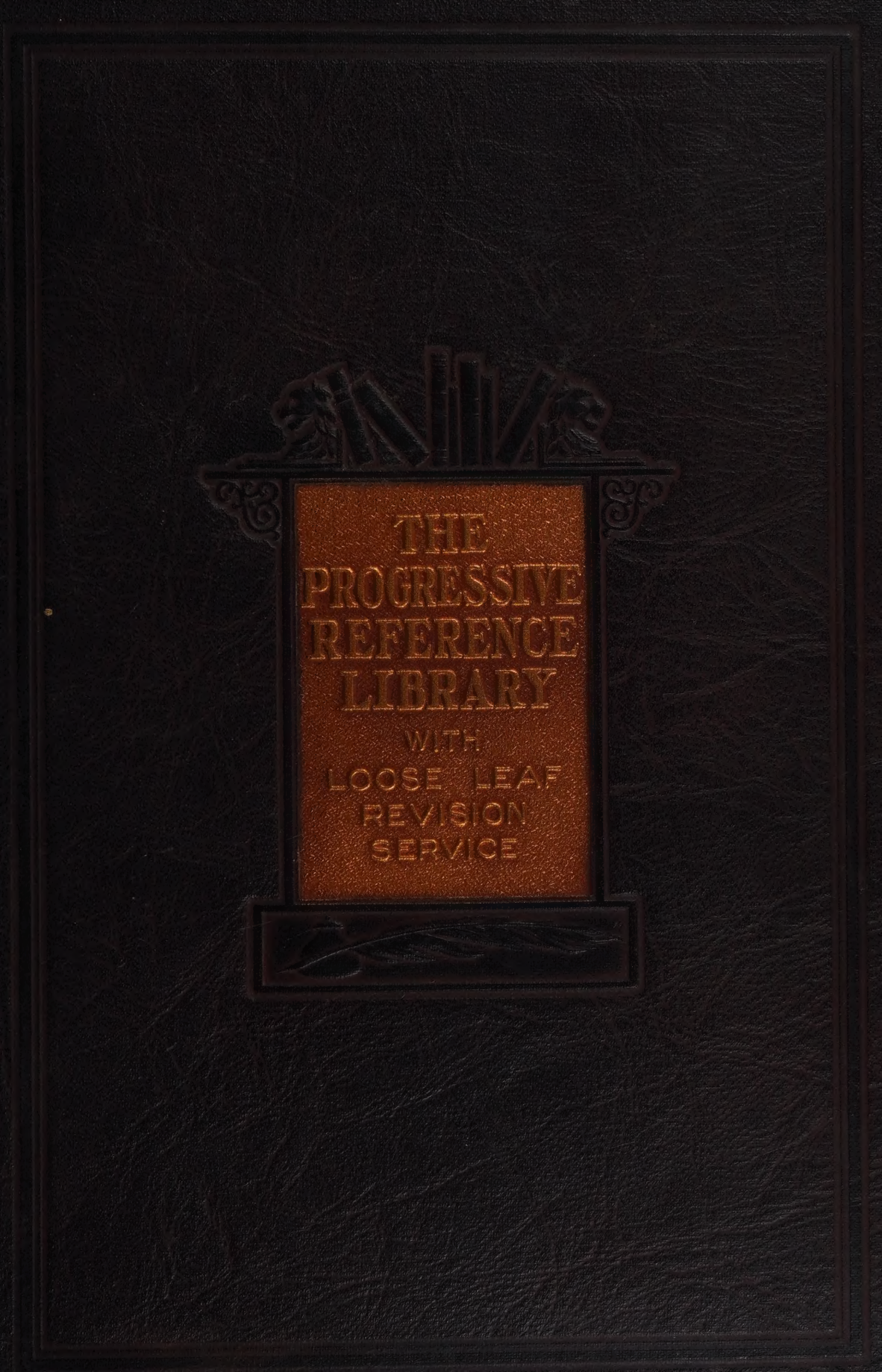
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of 275 miles joins the Seine near Paris. It is navigable for 210 miles. The Battles of the Marne were fought on its banks, between Châlons and Paris, in 1914 and in 1918.

MARNIX (mär'nĕks), **Philip van,** patriot and author, born in Brussels, Belgium, in 1538; died Dec. 15, 1598. He descended from a Dutch family of reputation, was an active supporter of the Reformation, and aided William of Orange in securing the throne of England. His defense of the Netherlands against the Spaniards made him popular with his people, and in 1583 he became burgomaster of Antwerp, which he defended against the Spanish army for more than a year, but was fianlly compelled to surrender. His writings consist largely of satires and poems. He is the author of the Dutch hymn of liberty, entitled "Wilhelmus."

MARONITES (măr'ō-nīts), a sect of Christians who constitute a class in Syria, so named from a monk called Maron The sect dates from the 5th century and numbers about 150,000. The Maronites acknowledge the Pope of Rome as their head, but have the privilege of using the Syriac language in their service and celibacy is not enforced upon the priests. They are under the direct supervision of the Patriarch of Antioch, who has his seat in a convent of the Lebanon Mountains. Gregory XIII. founded the Maronite College for them in 1584, at which their priests are educated.

MAROONS (mà-rōōnz'), a name applied in Guiana and Jamaica to the Negroes who have escaped from slavery and to their descendants. When England conquered Jamaica, in 1655, many slaves escaped to the mountains, where they constituted a formidable body until 1795, when they were subdued and removed to Nova Scotia and later to Sierra Leone. In Guiana the Maroons still number fully 4,000. They are organized into independent communities and support themselves by hunting, fishing, and pastoral pursuits.

MAROS (mŏ'rŏsh), a river of eastern Hungary, having its source in the eastern Carpathians. After a course of 400 miles it joins the Theiss near Szegedin. It is navigable for a distance of 228 miles, as far as Ujvar, and is an important commercial route. It receives the discharge from the Kokel River in Transylvania. On its banks are the cities of Vásárhely, Arad, and Ménes.

MAROT (mà-rō'), **Clement,** eminent poet, born in Cahors, France, in 1495; died in Turin, Italy, in 1544. He was educated at Paris, studied law, and afterward became associated with Francis I. as a poet and writer. In 1524 he accompanied that sovereign on his campaign into Italy, was wounded and taken prisoner at the Battle of Pavia, and returned to Paris in 1525. His literary productions are of a very high character from the standpoint of style, composition, and thought, and their influence upon French literature has been considerable. He translated the Psalms. His chief writing is a version of "Roman de la Rose."

MARQUE (märk). See **Letters of Marque and Reprisal.**

MARQUESAS (mär-kā'sàs), a group of Polynesian islands, located in the South Pacific Ocean. These islands were discovered in 1596 by Mendaña de Neyra, a Spanish navigator. The area is 495 square miles. Nukahiva, area 183 square miles, is the largest island. All the larger islands are mountainous, but the smaller islets and atolls have a level surface. The productions embrace tropical fruits, cattle, swine, and various manufactures. The inhabitants are a class of brown Polynesians. They tattoo themselves, are of strong physique, and have considerable development in industrial arts. The entire group has belonged to France since 1842. Population, 1922, 4,624.

MARQUETTE (mär-kĕt'), a city in Michigan, county seat of Marquette County, located in the Upper Peninsula, on Lake Superior. It is on the Lake Superior and Ishpeming and the Duluth, South Shore and Atlantic railroads. Among the noteworthy buildings are the high school, the county courthouse, the Federal building, the Peter White Public Library, the Northern State Normal School, the Upper Peninsula State Prison and House of Correction, and the Roman Catholic and Protestant Episcopal cathedrals. The manufactures include flour, powder, ironware, machinery, furniture, and lumber products. In its vicinity are quarries of brown sandstone, iron mines, and many fine grain and dairy farms. It was settled in 1845 and incorporated in 1869. Population, 1920, 12,718.

MARQUETTE, Jacques, noted explorer, born in Laon, France, in 1637; died May 18, 1675. He entered the order of Jesuits and in 1666 was sent to Canada as a missionary, where he made a study of the Indian languages and founded a mission at Sault Sainte Marie. Subsequently he began preaching among the Ottawa and Huron Indians and accompanied a number of them to Mackinaw, where he founded a second mission. In 1673 the governor of Canada sent him to explore the Mississippi River. Accordingly, he descended the Illinois River by canoes to the Mississippi, sailed down that river to the mouth of the Arkansas, and thence returned again by practically the same route, reaching Mackinaw after a journey of 2,500 miles. In 1674 he made a second trip to Illinois, when he built a log hut on the site of Chicago, and thence proceeded to the settlements of the Kaskaskia Indians, where, in 1675, he began building a mission near the present site of Kaskaskia, Ill. While at that place his health began to fail and, feeling certain that he could not long survive, he decided to return to Mackinaw, but his death occurred while he was near Lake Michigan. Marquette was accompanied by Joliet in his first voyage down the Illinois River, in 1673, and together with that

explorer left a number of valuable notes regarding the early aspect of the Mississippi valley. He was among the first to publish that the Mississippi River flows into the Gulf of Mexico.

MARRIAGE, a mutual and voluntary contract between a man and a woman, properly based on mutual regard and affection. As a condition of validity in most countries, the bond of marriage is authorized by a license and is dignified or solemnized according to certain legal forms. It implies that the contracting parties will live together as husband and wife until they are separated by death. All the civilized countries regard marriage as an essential institution and maintain laws for its proper protection. The main design of marriage is to constitute the family and for the preservation of moral and social purity, the continuance of the race, and the training of the young for the duties of life.

Three systems of marriage are recognized, but *monogamy,* in which an individual may have but one person in marriage, is now universally maintained in all the leading nations. *Polygamy* implies a plurality of wives and *polyandry* is the practice of having two or more husbands at the same time. In ancient times both polygamy and polyandry existed more or less among the people of the most intelligent nations, and both are still practiced to some extent in various countries, particularly in Tibet and other parts of Asia. Several of the Christian churches regard marriage among the sacraments, holding that it can be set aside only by death, while the law generally holds it to be a civil contract that may be terminated for good and sufficient cause under the divorce laws. Marriage and divorce laws are maintained in the provinces of Canada and the states of the United States, but no divorces are permitted in South Carolina, and these laws are modeled more or less after the common laws of the leading countries of Europe.

In general, a marriage contract cannot be made by males under 21 and females under 18 years of age, unless consent is given by the parents or guardians. A license must be obtained from a proper officer, usually the clerk of the courts, and the marriage solemnized by a clergyman or a civil officer competent to perform that act. In some states a definite number of witnesses must be present at the time. The marriage contract differs from general civil contracts in that it cannot be set aside by mutual consent, but only in a court having competent jurisdiction of such cases. The grounds for divorce include desertion, impotency at the time of marriage, the commission of felonies, and others, but in this the laws of the several states and most countries do not exactly coincide. A movement has been on foot for some time to unify the marriage and divorce laws, the consummation of which, no doubt, would be in the interest of bettering family relations.

The General Assembly of North Dakota, in 1899, enacted a law whereby it was made necessary for parties wishing to enter a marriage contract to appear before a commission of three physicians, such a commission being established in each county, and in their presence have it determined whether the parties wishing to marry are fitted to enter into such relations. Similar laws are in force in many countries of Europe. They are considered of value from a sanitary point of view, since they guard against the procreation of defective or degenerate offspring. A like control of marriage contracts has been advocated by national laws, since such legislation would establish uniformity throughout the country. See **Divorce.**

MARRYAT (măr'rĭ-ăt), **Frederick,** sailor and novelist, born in Westminster, England, July 10, 1792; died at Langham, Aug. 9, 1848. He joined the navy as midshipman in 1806, served on the Mediterranean, and in 1815 attained to the rank of commander. Shortly after he served in India, where he rose to the rank of captain, and after 1830 devoted his time to the study of literature and contributions to magazines. Many of his novels deal with life on the sea. They are especially interesting to the young and have had a very wide reading. Among the most widely known are "Frank Midway," "Midshipman Easy," "Japhet in Search of a Father," "The Phantom Ship," and "Jacob Faithful."

MARS, in Roman mythology, the god of war, corresponding to the Greek Ares. He was the son of Juno and the father of Romulus, hence

MARS.

is the traditional founder of the Roman race. In common with Jupiter he was designated father. Besides presiding over war, he was regarded the protecting deity who watched over the welfare of the state and presided over agri-

culture. The Romans maintained twelve priests of Mars, called *Salii*, who were always chosen from the noblest families. Before departing for the battlefield the Romans invoked the assistance and protection of the god of war, and any reverses of fortune were invariably ascribed to his anger. Many temples were dedicated to him in Rome, the most sacred being one on the Campus Martius, one on the Appian Way, and one built by Augustus in the Forum and called Mars the Avenger. In statuary he is represented with the helmet, shield, and spear, and the animals consecrated to him included the wolf, horse, vulture, and woodpecker. Many of the military exercises and the month of March were named in his honor, while his festivals were held in the month of March and on the Ides of October. Women did not participate in the worship of Mars.

MARS, a superior planet, the one most like the earth, with which we first come in contact in passing from the orbit of the earth, being located in space between the earth on one side and a vast cluster of asteroids on the other. It appears to the naked eye as a red star with a steady light, by which it is distinguished from the fixed stars. The mean distance from the sun is placed at 139,875,000 miles, and at perihelion it is about 26,000,000 miles nearer to that luminary than in aphelion. Mars moves through space with an average velocity of about fifteen miles per second, the day is about forty minutes longer than ours, and the year is equal to 687 terrestrial days. Its distance from the earth varies from 33,000,000 to 243,000,000 miles. Mars has a diameter of 4,200 miles, a volume one-fourth that of the earth, and a density of approximately three-fourths. The mass is about one-eighth of the terrestrial mass. Its orbit is inclined to the ecliptic at an angle of 1° 51′ 5″. The heat received from the sun is less than one-half that of the earth and its axis is inclined about 28.7°, therefore its seasons and zones are quite similar to ours. Its atmosphere is like ours and has clouds. The telescope reveals reddish spots that are thought to be continents and greenish tints which are considered bodies of water. The proportion of land to water is directly reversed from that of the earth, fully three-fourths being land. White portions apparently surrounding the poles indicate that there are snow zones. This is further verified by the snow zones apparently melting during the summer season and increasing in size on the approach of winter. No mountains have been discovered, but Professor Hall of the Naval Observatory, Washington, discovered two small satellites in 1877. The one nearest the planet is thought to be 5,900 miles from it and makes a complete revolution in seven hours and thirty-eight minutes, while the one farthest away is 14,600 miles and makes a revolution in thirty hours and fifteen minutes. See **Tesla, Nikola.**

MARSEILLAISE (mär-sā-yāz′), the celebrated war song of the French Republic, which was written by Rouget de Lisle (1760-1836), an officer of artillery, of Strassburg, Germany, in 1792. The name given to it by the author is "Song of the Army of the Rhine," but the name by which it is now known was applied to it from a party, or festival, given by the Marseillaise Club in Paris on the invitation of Madame Roland. The revolutionists adopted it in all the centers of population, but its use was forbidden during the empire. Soon after the beginning of the Franco-German War the republicans again made it popular.

MARSEILLES (mär-sā′y′), a seaport and commercial city of France, capital of the department of Bouches-du-Rhône, on the Mediterranean Sea. It has a good harbor and is important as a military and naval station. Communication is by interurban railways, steam railroads, and regular lines of steamships. A Greek colony from Asia Minor settled at its present site about the year 600 B. C., when it became known as Massalia. A high state of civilization flourished at Massalia under the Grecians nearly 600 years. It was taken by Caesar in 49 B. C., but with the decline of Rome it became subject to the attacks of Gothic invaders. The Saracens conquered it in 735, and in 1575 Henry III. of France made it a part of his dominion It has been noted from antiquity for its inclination toward republicanism and was for some time an independent city. In 1871 it was foremost in supporting the new republic.

Marseilles has many fine public institutions, among them government buildings, many public and parochial schools, several colleges, a university, and a public library of 100,000 volumes. The noteworthy buildings include the Hôtel de Ville, the Palais de Justice, the Byzantine cathedral, the Church of Notre Dame, and the Commercial Exchange. Its botanical and zoölogical gardens are among the finest in France, as are also its museum and system of elementary education. The manufactures include machinery, cotton and woolen goods, clothing, sugar, iron and brass wares, glass, oils, soap, chemical products, leather, silk, spirituous liquors, flour, and canned goods. Near the city are many valuable fisheries. The trade has been growing constantly in importance since the construction of the Suez Canal and the establishment of French colonies in North Africa. Among the municipal facilities are public lighting and waterworks, stone and asphalt pavements, electric street railways, sanitary sewerage, and city baths and markets. Population, 1921, 580,619.

MARSH, a tract of soft wet land, usually covered partially or wholly with water. Peat bogs, such as are common to Ireland, are found in many marshes, and they are frequently characterized by bogs, quagmires, and mucky tracts of land. Marshes are due to overflows, especially where springs or rivulets discharge so the water spreads over a considerable tract of low

and level land. Bogs and quagmires are found chiefly on hillsides, where springs have their outlet some distance above the valley, the outflow being obstructed by a tract of level land. In some cases landslides result, especially where small marshes are located on the sides of hills or mountains. Most of the deltas of great rivers are marshy, such as those of the Indus and the Mississippi. Other extensive marshes are found in Florida and along the Mississippi River, especially in Louisiana and Mississippi.

MARSH, George Perkins, diplomat and educator, born in Woodstock, Vt., March 15, 1801; died June 24, 1882. In 1820 he graduated at Dartmouth College, began the practice of law at Burlington, Vt., and in 1835 became a member of the State Legislature. He was a member of Congress from 1842 until 1848, being elected as a Whig, and in the latter year became minister to Turkey, but was sent on a special mission to Greece in 1852. In 1861 he was made minister to Italy, in which position he served until his death. Marsh was a lecturer and philologist of a wide reputation, having addressed large audiences in European and American cities, and lectured on philology at Lowell Institute and Columbia College. He wrote "The Origin and History of the English" and "Lectures on the English Language."

MARSH, Othniel Charles, naturalist, born in Lockport, N. Y., Oct. 29, 1831; died in New Haven, Conn., March 18, 1899. He studied at Phillips College, in Andover, graduated from Yale in 1860, and subsequently took advanced work in the German universities of Berlin, Heidelberg, and Breslau. He became professor of palaeontology at Yale in 1866, a position he retained to the time of his death. For the purpose of making special study of extinct vertebrate animals, he made several exploring expeditions to the Rocky Mountain region of the United States, where he discovered about 1,000 new species of vertebrates, crossing the Rocky Mountains 27 times in his researches. Some of his discoveries are of great value and have been designated as the product of the most studious scientist of the last century. Besides writing many scientific articles, he delivered numerous addresses, and published several volumes of reports on palaeontology. In 1898 he turned his entire collections over to the Peabody Museum at Yale. Several American and foreign scientific societies recognized his ability by according him distinguished honors.

MARSHAL (mär'shal), a term originally applied to the person who had charge of the horses of a high official. It is of German origin and was first used in connection with the horsemen of the king, but in the Middle Ages it came to be applied to the chief officer of arms, both in the army and at tournaments. Charles I. of England created the knight marshal's court, and this was presided over by the marshal of the king's household until 1849. At present the marshal of the king's bench has the custody of the marshalsea, or king's bench prison, in Southwark. *General field marshal* is the highest military honor in Germany and in France this honor is vested in the *maréchal de France.* In the United States a marshal is an officer of one of the Federal judicial districts, having duties similar to those of a sheriff. In some states the name is applied to the chief police officer of a town or city.

MARSHALL, a city in Missouri, county seat of Saline County, 82 miles east of Kansas City, on the Missouri Pacific and the Chicago and Alton railroads. It is surrounded by an agricultural country, which also has deposits of coal and building stone. Besides fine public schools, it has the Missouri Valley College and Saint Xavier's Academy. Other noteworthy buildings include the county courthouse, the city hall, and the post office. Among the manufactures are brick, bread, earthenware, canned goods, salt, and machinery. Electric lights and waterworks are among the improvements. The place was settled in 1839 and incorporated in 1866. Population, 1900, 5,086; in 1920, 5,200.

MARSHALL, a city in Texas, county seat of Harrison County, 40 miles northwest of Shreveport, La., on several State highways, and the Texas and Pacific railroad. It is surrounded by a fertile agricultural country, which contains mineral springs, deposits of iron, and valuable forests. The noteworthy buildings include the county courthouse, the Wiley University, the Bishop College, the post office, and the high school. Among the manufactures are machinery, furniture, cotton goods, oils, ice, and lumber products. Many of the streets are improved by grading and pavements. Population, 1900, 7,855; in 1920, 14,271.

MARSHALL, John, eminent jurist, born in Germantown, Va., Sept. 24, 1755; died July 6, 1835. After completing an elementary education, he entered upon the study of law, but soon after joined the Revolutionary army, serving under his father, Colonel Marshall, from 1775 to 1779, taking part in the battles of Brandywine, Monmouth, and several others. After the close of the war, he began the practice of law, was elected to the Virginia General Assembly, and served as Congressman from 1799 to 1800 and as Secretary of State from 1800 until 1801, being made Chief Justice of the Supreme Court by President Adams in the latter year, a position he held until his death. He rendered many opinions on the Constitution, presided over the Burr trial, and wrote "Life of Washington."

MARSHALL, Thomas Riley, statesman, born at Manchester, Ind., March 14, 1854; died June 1, 1925. He studied at Wabash College, practiced law successfully at Columbia City, and became prominent in politics as a Democrat. In 1908 he was elected Governor of Indiana and three years later, in 1912, was elected Vice-President of the United States, and again in 1916.

MARSHALLTOWN, a city in Iowa, county seat of Marshall County on the Iowa River, 58 miles northeast of Des Moines. It is on the M. & St. L., the Chicago Great Western, and the Chicago and Northwestern railroads. The city is surrounded by an excellent farming and dairying country and has a large commercial trade. Among the chief buildings are the county courthouse, the high school, the public library, the Pilgrim Hotel, and the Iowa Soldiers' Home. The manufactures include furnaces, trowels, gauges, clothing, machinery, soap, canned goods, and food items. It has electric street railways, brick and asphalt pavements, and systems of sewerage and waterworks. Marshalltown was settled in 1860 and was chartered as a city in 1868. Population, 1905, 12,045; in 1925, 16,868.

MARSHFIELD, a city of Wisconsin, in Wood County, 75 miles east of Eau Claire, on the Soo, the Chicago and Northwestern, and the Chicago, Milwaukee and St. Paul railroads. It is surrounded by a rich farming and stock-raising country. The manufactures include lumber products, machinery, clothing, and earthenware. Good public schools, electric lights, and waterworks are among the improvements. It is the seat of Saint Joseph's Hospital and a water-cure sanitarium. It has a growing trade in merchandise. Marshfield was settled in 1871 and became a city in 1883. Population, 1920, 7,394.

MARSH MALLOW, a plant of Europe and Asia, including several species, found in marshes and meadows. The common marsh mallow is a perennial plant, has a stem from two to three feet high, and bears a flesh-colored flower and a carrot-shaped root. The stem yields fibers, starchy substances, and sugars, though the last named are found principally in the roots. Different parts of the plant are used in the preparation of demulcent lozenges. Several species have been widely naturalized, among them the hollyhock, which is an allied plant.

MARSTON (mär'stŭn), **Westland,** dramatic poet, born in Boston, England, Jan. 30, 1820; died in London, Jan. 5, 1890. He published his first tragedy, entitled "The Patrician's Daughter," in 1842, by which he became widely known, after its presentation at Drury Lane. In 1876 two volumes of his poetical works were published. His son, Philip Bourke Marston, was born in London, Aug. 13, 1850; died there Feb. 14, 1887. He was blind from childhood. Hake's poem, "The Blind Boy," was dedicated to him, as was also Mrs. Craik's "Philip, My King." His first volume of poems was published in 1870, entitled "The Song Tide," and five years later a second volume appeared, entitled "All in All," while in 1883 he published a third, entitled "Wind Voices." His productions contain many beautiful sentiments, are of fine poetical construction, and attracted the favorable notice of Swinburne, Browning, Dickens, and Rossetti.

MARSTON MOOR, a region of England, situated seven miles west of York, celebrated for a battle fought there on July 2, 1644. It was a decisive contest between the royal army of Charles I. under command of Prince Rupert and the Parliamentary forces under Fairfax and Cromwell. The latter were victorious and the result was to bring Cromwell into prominent notice. The Royalists lost 4,000 killed and were compelled to flee.

MARSUPIALIA (mär-sū-pĭ-ā'lĭ-ȧ), a group of mammals that have a marsupium or pouch. It includes many widely distributed species, some being vastly different in their organization from ordinary mammals, while others are quite similar to each other. Some species are rodents. The group includes carnivorous, insectivorous, and several species of purely herbivorous animals. They are different from other mammals more particularly because the young are brought forth of a small size and imperfect in condition, and immediately after birth are placed in the *pouch,* or *marsupium.* The pouch contains mammae or teats to which the young become attached, and are there nourished by milk food to maturity. Naturalists connect the marsupials to birds and reptiles through the monotremata, since this arrangement faintly approaches the oviparous characteristics. Most species of marsupials are native to Australia and the vast archipelago southeast of Asia, but the American ant-eater, opossum, and bandicoot belong to the group. The principal species are the kangaroos, kangaroo rats, Tasmanian tigers, wombats, opossums, bandicoots, and ant-eaters.

MARTEN (mär'tĕn), a class of carnivorous quadrupeds, characterized by a slender and elongated body, short legs, sharp claws, a bushy tail, and a body which is formed similarly to that of the weasel. Martens live largely among trees, which they are able to climb with much facility. The North American group includes about ten species, among them the *beech marten, pine marten,* and *sables,* all of which yield valuable fur. Most of these species and several others occur in the northern part of Europe and Asia, particularly in Siberia, where the *sable marten* attains a large size, fully 45 inches in length. Several of the smaller species yield a fine grade of fur used in ornamental trimming.

MARTHA'S VINEYARD, an island of Massachusetts, off the southern coast, forming the principal part of Dukes County. Other islands connected with it are Chappaquiddick and the Elizabeth Islands. Martha's Vineyard is twenty-one miles long, from two to seven miles wide, and contains several prosperous towns and a railway line. The surface is gently undulating and has many species of trees and other plants. It is popular as a summer resort. Edgartown, in the eastern part of the island, is the county seat, and at the promontory of Gayhead is a lighthouse. The island was discovered in 1602 by Bartholomew Gosnold.

MARTIAL (mär'shĭ-ȧl), **Marcus Valerius**

Martialis, noted Roman writer of epigrams, born in Bilbilis, Spain, March 1, 43 A. D.; died in 104. He pursued study in his native town and in 66 went to Rome, where he resided until the year 100. At Rome he gained the patronage of Titus and Domitian by writing epigrams and poems characterized by much wit, and was awarded the rank of equestrian. His writings known as "The Epigrammata," consisting of fourteen books, constitute the only works from his pen that are still extant. They were widely read in Rome and the Roman provinces. The larger part of these were written at Rome, but several were completed in Gallia Togata, and others at Bilbilis. Martial displayed wonderful inventive facility. His works possess great literary value, particularly because they are the productions of an epigrammatist who did not draw his fund of inspiration from Grecian writers. In 100 he returned to Bilbilis, where he married a lady called Marcella, and resided on her estate until his death.

MARTIAL LAW (mär'shạl), a term pertaining to military operations, embracing the exercise of arbitrary power by the military authorities of regions where ordinary administration has been rendered inoperative by civil disturbances. It differs from military law, in that the latter governs the soldiers of an army at all times, while martial law is applied more particularly to civilians when accompanying a military force on active service, and its administration rests with the officials in supreme authority. The conditions under which martial law may be exercised are set forth in the army regulations of the national governments. For this reason, when officially proclaimed, the martial law displaces the civil law to a certain extent in a province or other minor subdivision of a country. In cases of riots or insurrections the Governor of a State or Territory, or the President of the United States, may declare martial law by proclamation, but it is limited to the region affected by the disturbances, which is said to be under martial law.

MARTIN. See **Swallow.**

MARTIN, the name of five popes of Rome, who reigned between 649 and 1431. Martin I. succeeded Theodore I. in 649; died Sept. 16, 655. Martin II. became Pope in 882; died in 884. Martin III. was Pope from 943 to 946. Martin IV. succeeded Nicholas III. in 1281; died on March 25, 1285. Martin V. succeeded John XIII. in 1417; died on Feb. 20, 1431. See **Pope.**

MARTIN, John, historical and landscape painter, born near Hexham, England, July 19, 1789; died Feb. 17, 1854. He first studied painting in Newcastle, but removed to London in 1806, where he married at the age of nineteen, and in 1812 made his first exhibit at the Royal Academy. The picture exhibited is entitled "Sadak in Search of the Waters of Oblivion" and brought him into favorable notice. His most famous works include "Expulsion from Paradise," "Joshua Commanding the Sun to Stand Still," "Fall of Nineveh," "Deluge," "Creation," and "Belshazzar's Feast." He was awarded a prize of $1,000 for the last named at the British Institution.

MARTIN, Saint, Bishop of Tours, born in the Roman province of Pannonia about 316 A. D.; died about 400. He was the son of a military tribune, was educated at Pavia, and entered the military service under Constantine. Later he saw service under Julian the Apostate. While serving in the army he embraced Christianity. On returning to his home, he converted his mother and many of his friends to the Christian faith. About 360 he established a convent near Poitiers, France, where he passed much of his time in seclusion, but in 371 was made Bishop of Tours. The Roman Catholic Church celebrates his birth on November 11. He is held in high esteem for his firmness in professing orthodoxy and because of great piety. The "Confession of Faith on the Holy Trinity" is the only literary work of Martin now extant.

MARTIN, Theodore, author, born in Edinburgh, Scotland, Sept. 16, 1816; died Aug. 18, 1909. He studied at the university of his native city and in 1846 became parliamentary solicitor in London. His first literary work consisted of contributions to *Fraser's Magazine* and in 1858 he translated "Poems and Ballads of Goethe," in which he was assisted by Professor Aytoun. Queen Victoria knighted him in 1880 because of his "Life of the Prince Consort," and in the same year he was made rector of the University of Saint Andrews. Among his later writings are "Ancient Classics for English Readers," "Life of W. E. Aytoun," "Life of Lord Lyndhurst," and "Helena Faucet, Lady Martin."

MARTIN, William Alexander, American missionary, born in Livonia, Ind., April 10, 1827. In 1846 he graduated at the Indiana State University, pursued a course in theology, and became a missionary to China under the Presbyterian Board. When concluding a treaty between the United States and China, in 1858, Martin served as interpreter for the minister, William B. Reed. He founded a mission in Pekin soon after and in 1859 became president of the Pekin Tungwen College, where he was an instructor in international law. The Chinese government sent him to the United States and Europe in 1880 to prepare a report on educational affairs, receiving the third rank of mandarin for his services. His publications embrace "Education, Philosophy, and Letters of China," "Religious Allegories," "Evidences of Christianity," "Chinese Legends and Other Poems," and a translation of Woolsey's "Study of International Law." He died Dec. 18, 1916.

MARTINEAU (mär'tĭ-nō), **Harriet,** authoress, born in Norwich, England, June 12, 1802; died June 27, 1876. She was the daughter of

a manufacturer, was reared in an intellectual and industrious home, and received a good literary training. Deafness began to affect her at an early age, and she was physically weak during most of her life. Her first writings appeared as contributions to the *Monthly Repository* in 1821, and soon after she reviewed for that periodical at the annual salary of $75. Her "Illustrations of Political Economy," which appeared in 1832, established a wide reputation for her, and this was followed shortly by "Illustrations of Taxation." These two publications went through many editions and gave her ample returns for support and further literary work. She visited Canada and the United States in 1834, on account of which she published "Society in America" and her "Retrospect of Western Travel." In the meantime she became a favorite contributor to the *Westminster Review*. Much of her life was made unhappy by ill health, but she was a student of scrutinizing vigor, had a wide range of human sympathy, and was esteemed by her friends and readers with the highest regard. Many of her writings are still widely read, some of them taking a favorite place in home and public libraries. The principal works, besides those named above, include "Household Education," "Forest and Game Law Tales," "History of the Thirty Years' Peace," "Life in the Sick Room," "Essential Faith of the Universal Church," "The Hour and the Man," "Feats of the Fiord," "Biographical Sketches," "Autobiography," and "Peasant and Prince." She translated Comte's "Positive Philosophy" from the French.

MARTINEAU, James, theologian, born at Norwich, England, April 21, 1805; died Jan. 11, 1900. He descended from a family of Huguenots and studied for the ministry at the Unitarian College in York. His first charge was at Dublin, whence he went to Liverpool, where he became known by his discussion of Christian theology. In 1853 he was made professor of mental and moral philosophy at Manchester New College, London, but for some time retained his pulpit in Liverpool. He was made principal of the college in 1868. Honorary degrees were conferred upon him by Oxford, Leyden, Edinburgh, and a number of other prominent institutions. According to his view, man has a power of conscience through which the higher of two conflicting motives may be ascertained without the aid of experience. His chief writings include "The Seat of Authority in Religion," "The Rationale of Religious Inquiry," "Hours of Thought on Sacred Things," "Unitarianism Defended," "Essays, Philosophical and Theological," and "Study of Spinoza."

MARTINIQUE (mär-tĭ-nēk'), an island of the Lesser Antilles, between the Caribbean Sea and the Atlantic Ocean, forming the most important of the Windward group. It is 42 miles long and from 10 to 20 miles wide. The area is 380 square miles. The Spaniards discovered it in 1493, on Saint Martin's day. It was first settled by the French in 1635 and has since been a French colony, with only several short intervals. At present it is represented in Paris by a senator and two deputies and has a resident governor and general council, with the seat of government at Fort-de-France. The climate is favorable and the soil is fertile. It has a number of excellent harbors. Among the chief productions are live stock, sugar, sweet potatoes, coffee, cacao, rum, tobacco, cotton, and tropical fruits. The export and import trade with France is extensive. Saint Pierre has a fine harbor and is the largest city. In 1902 the volcanic eruptions of Mount Pelée overwhelmed Saint Pierre and its vicinity, causing the death of 30,000 people. The inhabitants consist chiefly of the colored races, especially Negroes and Mulattoes, and include about 15,000 Europeans. Population, 1922, 200,108.

MARTINSBURG, a city in West Virginia, county seat of Berkeley County, in the Shenandoah valley, about 76 miles west of Washington, D. C. It is on the Cumberland Valley and the Baltimore and Ohio railroads. The principal buildings include the Federal courthouse and post office, the high school, the public library, and a number of churches and hospitals. Among the manufactures are lime, woolen goods, machinery, hardware, agricultural implements, clothing, and hosiery. It has a large trade in produce and merchandise. The place was settled and incorporated in 1778. At the time of the Civil War it was important as a base of supplies for the Confederates. Population, 1900, 7,564; in 1920, 12,515.

MARTIN'S FERRY, a city of Ohio, in Belmont County, on the Ohio River, nearly opposite Wheeling, W. Va. It is on the Pennsylvania, the Baltimore and Ohio, and other railroads, and has extensive communication by steamboats. It has a fine high school, a public library, and Walnut Grove Cemetery, the last mentioned containing the remains of many early settlers. The manufactures include engines, stoves, hardware, farming implements, glass, lumber products, and tin plate. An abundance of coal is produced in the vicinity. It has modern municipal facilities and a well-organized system of public instruction. The place was settled in 1769 and incorporated in 1865. Population, 1900, 7,760; in 1920, 11,634.

MARTIUS (mär'tsĕ-ŏŏs), **Carl Friedrich Philip von,** traveler and naturalist, born in Erlangen, Germany, April 17, 1794; died Dec. 13, 1868. In 1814 he graduated from the University of Erlangen and, after publishing several works on botany, joined an expedition under Spix for scientific investigation of the plants of Brazil in the interest of the Bavarian and Austrian governments. After penetrating a number of provinces in southeastern Brazil, he ascended the Amazon River, and in 1820 returned to Europe with a rare collection of plants and ani-

mals. Soon after he published much valuable information regarding the geography and products of Brazil. He was made conservator of the botanical garden at Munich in 1820 and six years later became professor of botany at the university in that city, holding the two positions until 1854. His publications include "Journey to Brazil," "Plants and Animals of Tropical America," "The Habits and Diseases of Brazilian Indians," "Ethnography and Language of Indians," and "Plants, Animals, and Products of Brazil."

MARTYN, Henry, missionary, born in Truro, England, Feb. 18, 1781; died Oct. 16, 1812. He graduated at Cambridge, studied theology, and in 1805 joined the East India Company as chaplain. After learning the Indian language at Serampore and Cawnpore, he made translations of the New Testament, the Psalms, and several books on religious matters into native dialects. Subsequently he traveled extensively through India, establishing everywhere a favorable impression of Christianity and civilized arts.

MARTYR (mär'tẽr), a word derived from the Greek equivalent of memory or witness, applied by the Christian churches to a person who suffers death rather than to renounce his religion, thus bearing witness to the truth by surrendering his life. In the early history of Christianity and during many periods up to modern times, widespread persecutions were frequent and many suffered death rather than forsake the Christian cause. Prayers were offered at the tombs of the martyrs by Christians, and in many cases praise services were conducted that persons would so willingly and positively maintain the faith. *Martyrology* is a discourse or treatise containing a list of saints and martyrs, with brief notices of their life and death, commemorated on each day of the year. The earliest treatise of this character was published in the 9th century, but the most extensive appeared in 1586, written by Cardinal Caesar Baronius (1538-1607), who connected with it critical commentaries.

MARX (märks), **Karl,** socialist and author, born in Treves, Germany, May 5, 1818; died March 14, 1883. He was the son of a celebrated jurist, studied law and philosophy at Bonn and Berlin, and in 1841 became editor of the *Rheinische Gazette,* a periodical devoted to the dissemination of social democracy. This periodical was suppressed in 1844, when Marx settled in Paris, where he published a newspaper called *Progress* and the *German-French Annuals.* In 1845 he was exiled from France, when he settled at Brussels, and there became a leading factor in the revolutionary movement of 1848, being the recognized head of socialism. After the Revolution he settled in London, where he published his "Criticism of Political Economy" in 1859, and established a powerful socialist organization known as the International Society. Subsequently he visited the United States and, on returning to Europe, became the principal factor in holding together and extending the influence of social democracy in Germany. In 1867 he published his celebrated work, entitled "Capital," which has since been regarded the most masterful and scholarly treatise of the relation between capital and labor ever written. It not only shows vast comprehensive ability and knowledge of social questions, but holds rank as the most reliable text on socialism. He also published works entitled "Philosophy of Proudhon" and "Herr Vogt."

MARY, The Blessed Virgin, the mother of Jesus, who is highly venerated by all Christians. Some authorities think that the genealogy in Luke is that of Mary, considering Heli to have been her father (Luke iii., 23), while others consider her the daughter of Joachim and Anna. Positive information of her life begins with her betrothal to Joseph, and the incidents attending the immaculate conception and the infancy of Christ. The New Testament mentions her in several places, but always in relation to Christ, three of the references to her being made during the public ministry of Christ and one after his death. It is not asserted positively in Scripture whether she had other children besides Jesus, but that theory is held by some, being based on the fact that Jesus is called her first-born son and that several individuals are mentioned as brothers of the Lord. Her life is described as one of great piety, and it is especially stated that she was persevering in prayer. According to tradition, she dwelt with John at Jerusalem after Christ's ascension, where she died, but some writers think that she retired with John to Ephesus after the siege of Jerusalem. Writers generally agree that her death occurred in the year 48 A. D., or in 63. The Roman Catholic church gives to the Virgin Mary especial devotion, which has been designated as *Mariolatry* by churches holding that she is not entitled to special veneration.

MARY I., Queen of England, daughter of Henry VIII. and Catharine of Aragon, his first wife, born at Greenwich, Feb. 18, 1516; died Nov. 17, 1558. She was noted in her youth for singular natural ability to learn and became the favorite of her father, who betrothed her to Charles V. of Spain in her seventh year. On account of her strong attachment to her mother, she was in danger of losing her life when her father secured a divorce, and she was further endangered in refusing to embrace the faith of the church of England. Her father's will entitled her to succession and, when Edward IV. died, on July 6, 1553, she ascended the throne. This consummation was opposed by an attempt under the leadership of the Duke of Northumberland to set her aside in favor of Lady Jane Grey, but the people favored Mary and she entered London amid much rejoicing on August 3, thus deposing Lady Jane Grey, who had been declared queen on July 10. The marriage en-

(Opp. 1720)

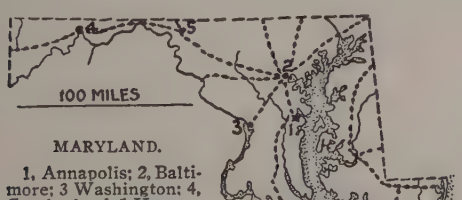
THE NATIVITY

gagement with Emperor Charles V. had been broken off at the time Henry VIII. sought a divorce from Queen Catharine and Mary was free to marry Philip II. of Spain, which she did in 1554. This course was protested against in England, and, after its accomplishment, the queen began to influence the movement for a complete restoration of the Catholic worship.

Previous to her marriage Queen Mary had sanctioned the execution of Northumberland and several others, but now extended persecutions began by which she became known as "the Bloody Mary." Cardinal Pole became the legate of the Pope, a change in religious faith was urged everywhere, and about 300 martyrs suffered death at the stake. Philip II. proved a selfish and heartless husband and Mary's domestic life was wretched and lonely. Philip induced her to declare war against France, which resulted disastrously to England and caused Calais to be lost after having been an English possession nearly 200 years. The queen had no children and died after much suffering from nervous debility and dropsy. Alfred Tennyson made her the subject of a tragedy.

MARY II., Queen of England, eldest daughter of James, Duke of York, afterward James II. of England, and his first wife Anna Hyde, born in London, April 30, 1662; died Dec. 28, 1694. She was educated in the Protestant faith, married the Prince of Orange, afterward William III., on Nov. 4, 1677, and was proclaimed joint sovereign with him on Feb. 12, 1689. She arrived in England on the following day and the coronation took place in April, when she was inaugurated like a king. Her death resulted from smallpox. The remains were buried in Westminster Abbey.

MARYLAND (mĕr'ĭ-lạnd), one of the thirteen original states of the United States, popularly called the *Old Line State*. It is bounded on the north by Pennsylvania and Delaware, east by Delaware and the Atlantic, south by Virginia and West Virginia, and west by West



MARYLAND.

1, Annapolis; 2, Baltimore; 3 Washington; 4, Cumberland; 5, Hagerstown. Chief railroads shown by dotted lines.

Virginia. The northern boundary is known as the Mason and Dixon's line and the southern border is very irregular, being formed by the Potomac River. Its length from east to west along the northern border is 215 miles, to which 35 miles of extension is added by the stretch eastward south of Delaware, hence the extreme length is about 250 miles. The greatest breadth from north to south is 128 miles. The area is 12,210 miles, of which 2,350 square miles are water surface.

DESCRIPTION. The larger part of the State is included in the Atlantic coast plain, but the western portion has ranges of the Blue Ridge and Allegheny mountains, which rise to heights of about 3,000 feet above sea level. Chesapeake Bay extends almost to the northern boundary, hence divides the State into what are known as the *east shore* and the *west shore*. The east shore has a general elevation of about 25 feet above the sea, but in the northern part it reaches 100 feet, while the west shore rises considerably higher, ranging from 25 feet in the southern part to 300 feet in the vicinity of the District of Columbia. The extreme western part is diversified by parallel ridges of mountains, separated by deep valleys, and all of the region is timbered. Between Chesapeake Bay and the mountains is a rolling and hilly country. Many islands are located in Chesapeake Bay and the shores are indented by important inlets, many of which furnish excellent harbors.

Most of the drainage is by small streams that flow into the Potomac, the Atlantic, and Chesapeake Bay. The region lying east of Chesapeake Bay is drained by the Chester, Choptank, Nanticoke, and Pocomoke rivers, all these flowing into Chesapeake Bay. The Susquehanna enters the State from Pennsylvania and flows into Chesapeake Bay. Other streams of the west shore include the Gunpowder, Patapsco, and Patuxent rivers. The Potomac, which drains the western part, receives the inflow from the Monocacy River.

The climate is healthful and may be said to be a transition between the frozen winter of the north and the open winter of the south. Snow falls in all parts of the State, but lies longest in the higher altitudes of the western section. At Baltimore the mean annual temperature is 56°, while the average for January is 30° and for July, 75°. The extremes of winter are 25° below zero and in summer, 102°, in the western part, and the southern and eastern sections are noticeably modified by proximity to the sea. All parts of the State have an abundance of rainfall, ranging from 36 inches in the western region to 45 inches in the coastal plain.

MINING. Coal is the chief mineral product and is found in a district of 500 square miles. Some of the veins are fourteen feet thick. The output is 2,800,000 tons annually, giving the State sixteenth rank in the production of coal. Fine building stones are found in many sections of the State. In the vicinity of Baltimore and Port Deposit are extensive quarries of granite and marble, whence much of the output is shipped for building purposes to Philadelphia, Washington, and New York City. Clays suitable for stoneware, pottery, paint, brick, and sewer pipe are abundant. Deposits of iron, copper, lead, feldspar, zinc, and mica are found

in different sections, but these are not worked extensively. Most of the mining industries are toward the western part and in the mountains.

Forests and Fisheries. The western section of the State has fine forests, consisting principally of oak, pine, chestnut, walnut, and hickory. Numerous species of southern plants thrive along the eastern shore, where the climate is equable and the soil is favorable to many kinds of shrubs and trees.

The fisheries of Maryland are very important and take rank next to those of Massachusetts. Chesapeake Bay is noted for its fine quality of oysters, and the streams flowing into it yield large quantities of shad. The oyster beds have an area of about 215 square miles, and the oysters taken annually constitute about 80 per cent. of the catch for the entire country. At present the output of oysters, including those sold in bulk and the canned product, has a value of $8,500,000. Other catches include crabs, white perch, striped bass, trout, carp, menhaden, and mackerel.

Manufacturing. The manufacturing industry is of much importance, having grown steadily from the early settlement of the State. About ten per cent. of the people are engaged in this enterprise, and the annual production has a value of $945,700,000. In the output of cotton duck Baltimore exceeds all cities in America, and it is the chief manufacturing and commercial center of the State. At present the canning and preserving of fruits and vegetables rank as the most important manufacturing enterprises. However, they are closely approximated by the output of tobacco, iron and steel, flour, and textiles. Large interests are vested in the manufacture of fertilizers, being stimulated by the extensive cultivation of fruits and vegetables. The canning and preserving of oysters and other shellfish has opened a large market for the fisheries of the State. Other manufactures include engines, steamships, machinery, hardware, candy, clothing, and scientific instruments.

Agriculture. About 82 per cent. of the land is included in farms, which average 112 acres. Corn is grown on the largest area devoted to any one cereal, but it is closely approximated by the cultivation of wheat. Hay holds third rank in acreage. Other products include oats, tobacco, potatoes, and fruits. The State has large interests in gardening and fruit raising and much of the product is shipped to Baltimore and other cities, or is canned for the market. The area cultivated in sweet potatoes is 10,500 acres and that of white potatoes is 45,000 acres. A superior quality of peaches are grown and the output of the peach orchard is more than half of all the fruit raised in the State. Considerable interests are vested in rearing cattle for meat and dairying. Other domestic animals include horses, swine, sheep, mules, and poultry.

Transportation. The first railroad in the United States, the Baltimore and Ohio, has extensive trunk lines that connect the cities of the State with Philadelphia, New York, and Chicago. Other lines include those of the Pennsylvania system, the Baltimore and Lehigh, and the Western Maryland. The lines operated aggregate about 1,520 miles. Numerous electric railways extend into the country from Baltimore, Cumberland, and other cities. The shores of Assateague Bay and the Atlantic have shallow water and are not important for commerce, but Chesapeake Bay has many fine harbors. Large steamers navigate the Potomac to Washington, a distance of 125 miles, and large boats ascend the Susquehanna. The Chesapeake and Delaware Canal extends from Chesapeake, Md., to Delaware City, Del.; and the Chesapeake and Ohio Canal connects Cumberland, Md., with Washington, D. C. Baltimore is the chief railway and commercial center. The exports consist largely of oysters, fruits, coal, and fish, and the imports embrace raw material and food stuffs.

Education. Maryland has an efficient system of public education. The per cent. of illiteracy among whites is 1.8 and among negroes it is 18.2, the latter being about the average in the states that have a large colored population. General supervision is vested in the State board of education, which is composed of the Governor, the principal of the State normal school, the State superintendent, and four persons appointed by the Governor. A board of school trustees appointed by these commissioners has general management of the districts. The school year averages about 188 days. Separate schools are maintained for white and colored children. State normal schools are located at Frostburg and Baltimore and a normal department is maintained in Washington College.

Johns Hopkins University, at Baltimore, is one of the leading centers of education in America. Other institutions of higher learning include The University of Maryland and the Women's College at Baltimore; the Western Maryland College, Westminster; the Rockhill College, Ellicott City; the Saint John's College, Annapolis; the Washington College, Chestertown; and the Jacob Tome Institute, Port Deposit. Baltimore has houses of refuge for boys and girls and the State penitentiary. Owings Mills has an institution for feeble-minded children and Spring Grove and Sykesville have hospitals for the insane. The school for the deaf is at Frederick and schools for the blind and deaf are maintained at Baltimore. Near Pikesville is the Maryland Confederate Soldiers' Home.

Government. The constitution now in force was adopted in 1867. It vests the chief executive authority in a Governor, who is elected for a term of four years. In case the office is vacant, the Governor is elected by the Legislature, but if that body is not in session the succession is vested in the president of the senate

and the speaker of the house, respectively. Other State officers include the attorney-general, comptroller of the currency, and treasurer. The Legislature consists of a senate and a house of delegates, the former having 27 and the latter 101 members. Though the senators are elected for terms of four years, they are apportioned so the terms of one-half expire every two years, and the members in the house of delegates are elected for two years. Biennial sessions of the Legislature are held. The regular sessions are limited to ninety days and the special sessions to thirty days. The chief judges of the first seven circuits and a special judge in Baltimore comprise the highest court, known as the court of appeals. Each circuit, except the circuit of Baltimore, has a chief judge and two associate judges, while Baltimore has nine judges. All of these judges are elected by the people, and the courts over which they have charge have jurisdiction of civil and criminal cases. The justices of the peace are appointed by the Governor and senate, and the judges of the orphans' courts are elected.

INHABITANTS. About half of the inhabitants reside in cities having a population exceeding 8,000. The density per square mile is 146 inhabitants. Only a small per cent of the people are of foreign birth and these are represented chiefly by Germans. Annapolis, the capital, is located on the Severn River. Baltimore, the largest city, contains about one-half of the total inhabitance of the State. Other important cities include Cumberland, Hagarstown, Frederick, and Cambridge. In 1900 the State had a population of 1,188,044. This included a total colored population of 235,620, of which 235,064 were Negroes and 544 were Chinese. Population, 1906, 1,275,443; in 1920, 1,449,610.

HISTORY. The first settlements in Maryland were made by Cecil Calvert, Lord Baltimore, in 1634. His father, George Calvert, was Secretary of State under James I. and became associated with the London Company, but conflicts arose with traders who made claims under the Virginian, William Clayborne. Religious toleration was extended to all, but the Protestants outnumbered the Catholics after 1691. The feudal system of land had been established, but this was overthrown in 1688, when the representatives of Lord Baltimore declined to proclaim William and Mary as ruling sovereigns. The charter first granted included Delaware and a part of Maryland, but final adjustments were made in 1760, and Mason and Dixon's line was finally established in 1767 to mark its present limits. The Articles of Confederation adopted by Congress in 1777 were not ratified until in 1781, but Maryland actively supported the Revolutionary War. It likewise supported with alacrity the War of 1812 and the Mexican War, and, though a slave-holding State, it did not secede from the Union in the Civil War, but many of the citizens fought in both the armies.

MARY MAGDALENE (mā'rĭ măg-dà-lē'ne). See **Magdalene.**

MARY STUART (stū'ĕrt), **Queen of Scots,** born in the palace of Linlithgow, Scotland, Dec. 8, 1542; executed Feb. 8, 1587. She was the daughter of James V. of Scotland and Mary of Lorraine, a daughter of the Duke of Guise of France. Her father died when she was but a few days old and she succeeded him as sovereign. On Sept. 9, 1543, the coronation ceremony was performed upon the infant, the Earl of Arran was made regent, and she was shortly after promised in marriage to Prince Edward of England, but the Parliament of Scotland annulled the betrothal. Soon after she was betrothed to the Dauphin of France, afterward Francis II., and in 1548 she was taken to France, where she received an education at the French court and in a convent. In 1558 she married the dauphin, who succeeded Francis I. as king on July 10, 1559, but the young king died on Dec. 5, 1560, when Mary was deprived of the reigning power by the queen mother, Catharine de' Medici, as regent for her son, Charles IX.

The widowed queen returned to Scotland in 1561, evading on the route the vessel sent by Elizabeth of England to capture her. Though many suitors were proposed to her in marriage, she wedded her cousin Henry Stuart, Lord Darnley. This action caused the Protestants to organize a powerful opposition, since both Mary and her husband were Catholics, and they were soon after forced to seek safety in England. In the contest Mary showed much bravery, taking the field in person and displaying an unusual patriotism in defending law and her rights. However, it soon became apparent that Darnley sought to secure supreme power, and by his reckless disposition alienated the affection of the queen as well as to cause her to decline in popularity. David Rizzio was Mary's chief minister. He was on intimate terms with Darnley, but the latter assumed that he stood in the way of the crown, and accordingly formed a conspiracy by which Rizzio was murdered on March 9, 1566, Darnley taking an active part in the crime.

Darnley now attempted to assume complete control of Scotland, but in this he was prevented by the ingenuity of Mary, and, when their son was born, who afterward became James VI. of Scotland and I. of England, an apparent reconciliation was effected, but it was neither impressive nor lasting. The Earl of Bothwell now became a prominent adviser of Mary, and in 1566 took a prominent part at the baptizing of James at Stirling Castle. Darnley soon after became stricken with smallpox at Glasgow, where he was cared for by his father, and later Mary had him removed to Edinburgh. While there he was personally attended by Mary, but on Feb. 10, 1567, the house in which he was cared for was blown up by gunpowder and he

was killed. Suspicion was attached to Bothwell and to Mary as having planned his death, owing to their strong attachment for each other, and about three months later the two were married.

The Scottish nobles formed a compact against Bothwell and Mary and on July 29, 1567, she was compelled to abdicate the throne to her son, who became king under the regency of the Earl of Moray, but Bothwell escaped to Denmark, while Mary was kept in captivity. Several friends succeeded in effecting her escape from Loch Leven on Nov. 2, 1568, when she gathered an army of 6,000 men to regain power, but was defeated in the Battle of Langside and fled to England for protection by Elizabeth. Mary having claimed the right of succession to the English throne as the great-granddaughter of Henry VII., Elizabeth imprisoned her for eighteen years. Many attempts were made to secure her liberation, all of which failed, and at last some of her enemies charged that she was implicated in a conspiracy to assassinate Elizabeth, and accordingly secured her trial and condemnation, the conviction taking place Oct. 25, 1586. Elizabeth refused to sign the death warrant for a long time, but she yielded at last on Feb. 1, 1587.

Mary displayed singular courage, protested her innocence to the very last, and, when she was brought to the block on Feb. 8, she conducted herself with the dignity and courage of a heroine. Writers have generally agreed that Mary was a woman of rare intellect, skilled in music, accomplished in languages, and possessed of rare personal charms. She remained a devout Catholic and in the last services uttered a prayer, instead of listening to the attending chaplain. She has been made the subject of many literary gems, among the most beautiful being Schiller's "Mary Stuart."

MARYSVILLE, a city in California, county seat of Yuba County, at the confluence of the Feather and Yuba rivers, 48 miles north of Sacramento. It is on the Western Pacific and the Southern Pacific railroads. The chief buildings include the county courthouse, the city hall, and the college of Notre Dame. It has manufactures of flour, woolen goods, machinery, tractors, brick, and canned goods. The surrounding country is mining and fruit growing. The place was founded in 1849, when it was known as New Mecklenburg, and it was chartered as Marysville in 1851. Population, 1900, 3,497; in 1920, 5,461.

MASACCIO (mȧ-zät'chō), also known as Tommaso Guidi, celebrated painter, born in the Arno valley, Italy, about 1401; died at Rome in 1429. He went to Florence for study and executed much of his work in that city. His productions comprise a number of fine frescoes, including those in the Church of Saint Clement at Florence. Among his paintings are "Temptation of Adam and Eve," "Expulsion from Paradise," "Peter and the Tribute Money," and a number in connection with the miracles of Christ and scenes in the lives of the apostles.

MASAI (mä'sī), a race of people found in British East Africa, classed with the Ethiopian-Negro races. While the color is chocolate, they are quite like Europeans in features, except that the eyes are slightly oblique. The hair is black and frizzly, the stature is large, and the physique is well developed. Several tribes or clans are included, all of which are nomadic and subsist chiefly by hunting and stock raising. They are fond of ornaments, such as beads, rings, and brooches. The Masai are largely pagans and make sacrifices of vegetables and fruits to their idols. They do not bury the dead, but leave them to be devoured by hyenas and birds of prey. They engage in warfare and have a loosely organized militia. More recently they have made some advancement in agricultural arts and fruit raising, tools and machinery having been imported for that purpose since the country became British territory.

MASANIELLO (mä-zȧ-nyĕl'lō), known also as Tommaso Amiello, Italian revolutionist, who organized a revolt against Spanish authority in July, 1647. He was a fisherman at Amalfi, Italy, where he was born in 1623. When oppressive taxes were levied, he joined others in making armed resistance and soon became leader of the opposition. The revolt assumed such extensive proportions that many of the customhouses were seized, palaces were destroyed, and outraged justice was enthroned. Later Masaniello became addicted to strong drink and during a fit of excitement inaugurated a reign of terror, in which much property and life were destroyed. He was assassinated in Naples on July 16, 1647.

MASAYA (mȧ-sä'ȧ), a city of Central America, in Nicaragua, near a lake of the same name, fifteen miles southeast of Managua. It has railroad connections, is one of the oldest cities in Nicaragua, and has an important trade and some manufactures. Near it is the celebrated volcano of Masaya, which in 1670 had an eruption that spread lava in a northerly direction fully twenty miles. The inhabitants of the city are largely of Indian descent and have made considerable advancement in the industries. Population, 1922, 19,306.

MASHONALAND (mȧ-shō'nȧ-lănd), a province of Rhodesia, South Africa, located between Matabeleland and the Zambezi River. The surface has an elevation of from 3,000 to 5,000 feet above the sea and consists mainly of a fertile region. The drainage is mainly by the Sabi and tributaries of the Zambezi. It has a healthful climate, but the rainfall is not sufficient to make all classes of farming profitable. Valuable deposits of gold are worked and several railways are operated, the chief outlet to the coast being by a line from Salisbury to Beira, a port on Mozambique Channel. Stock

raising, farming, and mining are the principal occupations. Rice is grown successfully in the lowlands. Other products include fruit, tobacco, flax, and vegetables.

Carl Mauch, a German traveler, explored the region in 1871. He came in contact with the natives, who are known as Mashonas, and discovered a number of ruins indicating a former high state of civilization. These ruins are centered at a place called Zimbabwe, where are located many remains of ancient temples and fortresses. They appear to belong to prehistoric times and are sometimes identified with the Ophir of the Bible. Great Britain acquired Mashonaland in 1890. Salisbury is the seat of local government, but politically it belongs to the territory of Southeastern Rhodesia. In 1907 Mashonaland had 7,654 European inhabitants. Population, 1922, 492,732.

MASK, a covering worn to disguise or protect the face. The practice of wearing masks in the drama originated in ancient times, probably among the peasants of Greece, where they were associated with the worship of Bacchus. These coverings were of various kinds, though most of them either concealed the face only or covered the entire head. They were usually much larger than the natural head or face, and were provided with mouthpieces so as to permit the wearer to speak with a louder voice. Later the mask played an important part in the drama of Rome, where it was afterward worn at balls and masquerades, similar to the practice of modern times.

Another kind, known as *death masks,* are valuable in that they closely resemble the faces from which they are modeled. They are made by covering the face of the dead body with oil and then applying a covering of plaster of Paris. The oil prevents the form from becoming fastened to the skin and, when it is sufficiently hardened, it is removed. This death mask is then carefully oiled and fresh plaster is poured into it, which, when sufficiently dried, closely resembles the face. Death masks of this kind were made of thin gold plate by the Egyptians, of wax by the Romans, and of clay by the Peruvians. It is possible to make similar masks from the face of the living and these are better than those made from the dead, as the product more nearly resembles the form of the face during life.

MASON (mā's'n), **George,** statesman, born at Doeg's Neck, Va., in 1725; died Oct. 17, 1792. He settled at Mount Vernon, where he formed an intimate friendship with Washington, and in 1775 was made a member of the Virginia committee of safety, which became responsible for the government of that colony. He drafted the declaration of rights and a new constitution for Virginia in 1776, and in 1787 served as a member of the convention which drew up the national Constitution. Several provisions of the Constitution were objectionable to him, on account of which he joined Patrick Henry in opposing its adoption in the Virginia Assembly, and later identified himself with the Anti-Federalists. He declined serving in the Continental Congress and as United States Senator from Virginia after having been elected, and retired from public life to his home on the Potomac. His statue is included with that of Jefferson, Henry, and others in a group surrounding the statue of Washington, which occupies a position at the front of the capitol in Richmond, Va.

MASON, James Murray, public man, born in Fairfax County, Virginia, Nov. 3, 1798; died April 28, 1871. He studied at the University of Pennsylvania, where he graduated in 1818, and afterward was a student of law at William and Mary College. In 1836 he was elected to the State Legislature, served in Congress from 1837 until 1839, and in 1847 became a member of the United States Senate, serving until 1861, when he resigned to join the Confederacy. In Congress he advocated the famous Fugitive Slave law, of which he was the author. In 1861 he was made a commissioner with John Slidell and started for England, but while at Havana they were seized in the British steamer *Trent,* by Captain Wilkes of the ship *San Jacinto.* The British government demanded their release, which was granted by the United States in 1862. This is known as the Trent Affair (q. v.) and almost caused a war between Great Britain and the United States. After his release from Fort Warren, Boston, he sailed for England, where he vainly attempted to secure the intervention of England and France for the Confederacy. After the war he returned to America and lived in Canada until 1868, when he took up his residence near Winchester, Va.

MASON, Jeremiah, jurist and statesman, born in Lebanon, Conn., April 27, 1768; died in Boston, Mass., Oct. 14, 1848. In 1788 he graduated at Yale, three years later was admitted to the New Hampshire bar, and entered upon the practice of law at Westmoreland. He was elected attorney-general of the State as a Federalist in 1802, was a United States Senator from 1813 until 1817, and subsequently served in the State Legislature several terms. In 1832 he began an extensive law practice in Boston, taking rank as an advocate with such men as Daniel Webster and Judge Story.

MASON, John Young, public man, born in Greensville, Va., April 18, 1799; died Oct. 3, 1859. He graduated at the University of North Carolina, studied law, and began a successful practice in his native State. In 1830 he was elected a member of Congress and was twice reëlected, and in 1837 became a judge of the Federal court for Virginia. President Tyler made him Secretary of the Navy in 1844, and he held the same position during a part of the succeeding administration. In 1853 he was made minister to France by President Pierce. In 1854 he coöperated with Soule and Buchanan, minis-

ters of the United States to Spain and England, respectively, and in conjunction with them drew up the famous Ostend Manifesto.

MASON, Lowell, musician, born in Medfield, Mass., Jan. 8, 1792; died Aug. 11, 1872. His aptitude for music was so marked that he became a teacher of singing classes and a choir at the age of sixteen and in 1812 settled at Savannah, Ga., where he developed a reputation for musical talent. He removed to Boston in 1827 and there effected much improvement in musical sentiment and its public appreciation. With others he helped to found the Academy of Music in Boston, and in 1837 visited extensively in Europe. The University of the City of New York conferred a degree upon him in 1855. He published many collections of songs set to music for Sunday schools, churches, and glee clubs, and is perhaps the best known composer of church music in America. His most important work was published in 1822, entitled "Handel and Haydn Society's Collection of Church Music."

MASON AND DIXON'S LINE, the boundary line between Pennsylvania and Maryland, so named from Charles Mason and Jeremiah Dixon, two English surveyors, who located it between the years 1765 and 1767. A portion of this line was completed by others, the two surveyors not finishing the survey entirely. It passes along 39° 43′ 26.3″. When the Missouri compromise was before Congress for discussion, John Randolph of Virginia applied the phrase to designate the line between free and slave territory and the term came into popular use. However, Mason and Dixon's line as applied to slave territory passes from the boundary between Pennsylvania and Maryland down the Ohio to the Mississippi and thence west on the parallel of 36° 30′, this being the southern boundary of Missouri, though Missouri was a slave State. The original Mason and Dixon's line was designated by milestones located at points five miles apart, on one side of which was cut the coat of arms of Lord Baltimore and on the other side that of William Penn.

MASON BEE, the name of several bees that construct their cells of mud. They are quite small in size and most of the species are dark in color. The cells are constructed in chambers of hollow trees, under flat stones, or in empty shells. Some species glue the materials, such as sawdust, sand, and chips, together in the course of construction, and the inside is made smooth for the storage of honey and pollen for the larvae, one of which occupies each cell. Some of these bees construct cells of great perfection, especially those common to the warmer climates. Many temples in Egypt contain cells built by bees of this class. In some places they are fastened to the ceilings and hang downward like stalactites. In the region of the Baltic Sea the bees of this class fasten their cells to the eaves of houses. Several species native to the United States construct mason work with considerable ingenuity. The larvae of these bees spin delicate cocoons and winter as pupae. Not more than from ten to twenty cells are in a group. The honey stored by these bees is mixed with pollen and is unsuitable for use.

MASON CITY, a city in Iowa, county seat of Cerro Gordo County, 88 miles northeast of Fort Dodge. It is on the Chicago Great Western, the Rock Island, the Chicago and Northwestern, and the Chicago, Milwaukee and Saint Paul railroads, and is surrounded by a farming and dairying country. The noteworthy buildings include the county courthouse, the high school, the public library, the Odd Fellows' Orphans' Home, the Y. M. C. A., and several fine hotels. Among the manufactures are flour, sugar, brick, machinery, and cement. Building stone is quarried in its vicinity. It was settled in 1855 and incorporated in 1870. Population, 1905, 8,357; in 1925, 22,682.

MASONRY. See **Freemason.**

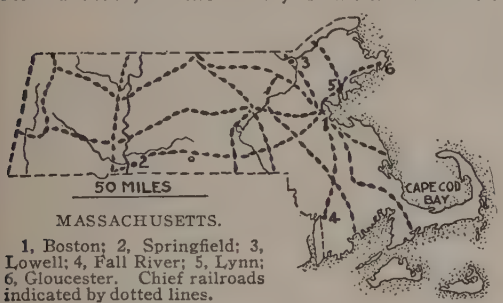
MASQUE (màsk), a kind of dramatic entertainment, comprehending scenic effect and dances. It was popular in Europe during the 16th and 17th centuries, and reached its highest point of development in England during the reign of James I. In the Middle Ages it was confined largely to the shows patronized by the middle classes and to religious processions, when the actors wore masks. It became recognized as a form of the spoken drama in the miracle and moral plays and was the only form of dramatic art in which females, generally ladies of rank, took part. Ben Jonson and the leading dramatic authors in the reign of James I., with the exception of Shakespeare, wrote masques for the court. Milton's "Arcades" and "Comus" are, from the literary point of view, beautiful specimens of the writings that may be classed as masques. Henry Lawes furnished the music for several court masques written by Inigo Jones. The queens of James I. and Charles I. joined the chief nobility of the court in participating in these entertainments, the preparation of which frequently occupied many months. With the death of Ben Jonson, who may be regarded as the chief writer of masques, and the rise of the Civil War the taste for them declined.

MASS, the prayers and ceremonies offered by the Roman and the Greek Catholic churches in connection with the perpetual sacrifice of the new covenant, in which the body and blood of Christ are held to be really and truly received in communion under the species of bread and wine. The mass as held at present embraces four principal parts: the *introduction,* the *sacrifice,* the *consecration,* and the *communion.* A mass held on an extraordinary occasion is called the *Votive mass.* The ordinary mass performed by the priest without music is called *Low mass.* When celebrated with the assistance of a deacon or other clergyman and accompanied by vo-

cal and instrumental music, it is known as *High mass.* A *Requiem* mass is offered for the dead and a *Pontifical* mass is celebrated by a bishop. The Latin rite is used in the Roman and the Coptic, Greek Syriac, and other rites are employed in the Greek church. All are expected to hear mass on holy days of obligation and on all Sundays.

MASS, a term used in physics to designate the quantity of matter which a body contains. It is precisely proportional to the weight of the body and embraces the sum of all the material particles of the body. Two bodies are regarded of equal mass, if they exactly balance each other when placed in opposite scales in vacuo.

MASSACHUSETTS (măs-sà-chū'sĕts), one of the thirteen original states of the United States, popularly called the *Old Bay State.* It is bounded on the north by Vermont and New Hampshire, east by the Atlantic Ocean, south by the Atlantic Ocean, Rhode Island, and Connecticut, and west by Rhode Island and New York. The length from east to west is 184 miles and the average breadth is 48 miles, but the distance from Nantucket Island, in the south, to Round Rock, in the north, is about 115 miles.



MASSACHUSETTS.

1, Boston; 2, Springfield; 3, Lowell; 4, Fall River; 5, Lynn; 6, Gloucester. Chief railroads indicated by dotted lines.

A number of islands and peninsulas in the Atlantic, together with three important bays, give the State an irregular coast line. The area is 8,315 square miles, which includes a water surface of 275 square miles.

Description. The eastern half of the State is located in the Atlantic coast plain, where the surface is generally level or undulating. Cape Cod Peninsula is a low and sandy tract that extends toward the southeast in the form of an arm, north of Nantucket Sound, and at the extremity curves slightly toward the northwest. Immediately south are Nantucket Island, Martha's Vineyard, and the sixteen Elizabeth Islands. The ocean frontage, measuring the indentation, is nearly 300 miles. Massachusetts Bay, Cape Cod Bay, and Buzzard's Bay are the principal indentations. In the western part are ranges of the Green, Hoosac, and Taconic mountains. These belong to the Appalachians and extend into the State from Vermont. In the western part of the State they are known as the Berkshire Hills, since they cover Berkshire County. Greylock or Saddleback Mountain, the highest peak of the Taconic Range, has an altitude of 3,535 feet. Spruce Hill, elevation 2,588 feet, is the highest summit of the Hoosac Range. Within this highland section is the valley of the Hoosatonic and east of it is the Connecticut valley. The former has an elevation of 800 feet in the south to about 1,100 feet in the north, but the Connecticut valley is much lower, sloping gradually from the north toward the south. Several isolated peaks are located in the central part of the State, including Mount Tom, 1,215 feet, and Mount Holyoke, 955 feet.

All parts of the State are well drained, but the rivers are not important from the standpoint of navigation. The Connecticut, which flows entirely through the State, is characterized by numerous falls and cataracts. It receives the inflow from the Chicopee and Miller's rivers, from the east, and the Westfield and the Deerfield, from the west. The Hoosac and Housatonic rivers drain the region between the Taconic and the Hoosac Mountains, flowing into the Hudson, which discharges into Long Island Sound. The Merrimac flows through the northeastern part of the State, discharging into the Atlantic near Newburyport. Other streams include the Blackstone and the Taunton, discharging into Narragansett Bay, and the Concord, a tributary of the Merrimac. All of the streams are important for the water power which they furnish, and in consequence many manufacturing cities have been built upon their banks. Near Cape Cod and in various parts of the State are a number of small lakes, usually called ponds. Boston has the most important harbor in the State, but good harbors are also located at Salem, Lynn, Gloucester, Marblehead, and at the mouth of the Merrimac. Cape Ann and Cape Cod are the principal extensions into the Atlantic.

The climate is healthful, though variable, and the prevailing winds are from the east. It is more equable in the east than in the west, and in the mountainous regions the winters are quite severe. All parts of the State have an abundance of rainfall, which is distributed evenly throughout the year. It averages annually 40 inches. Heavy snows fall in the mountains, usually from 50 to 60 inches. Nantucket Island and vicinity have the highest wind average in the United States, the velocity for the year being fourteen miles per hour. The temperature falls to 20° below zero and rises to 100° above, and the mean temperature for the year is 48°.

Mining. In the output of granite the State has high rank. The quarries are located mainly in the eastern part, and the product is used extensively for building and monument purposes. Large quantities of limestone are quarried and used in the manufacture of lime. Clays of commercial value are widely distributed. The product is employed to a large extent in the manufacture of pottery, brick, sewer pipe, and tile. A large per cent. of the iron pyrite used in

making sulphuric acid is obtained in the State. Other products include slate, tin, corundum, and manganese.

Fisheries. Boston has been an export market for fish since 1633. Gloucester continues to hold rank as one of the most important centers of cod and mackerel fisheries in the world. Other catches of importance include the halibut, herring, and many species of shellfishes. The principal oyster beds are off the southern coast. Woods Hole, on the south shore of Buzzard's Bay, has an extensive government hatchery and laboratory, and hatcheries operated by the State are located at Winchester and Wilkinsonville.

Agriculture. While agriculture is not an extensive enterprise, about 50 per cent. of the land is included in farms, which average 83 acres. Hay is the principal product and is grown on a larger area than all the other farm products combined. The value of hay and forage produced equals forty per cent. of the total value of all crops. Farming is confined principally to the valleys, where the soil is fertile, and it is devoted largely to dairying. Corn and potatoes are grown on about an equal area. Other products include oats, rye, and potatoes. Large interests are vested in truck gardening, poultry raising, and fruit growing. Apples, plums, peaches, pears, and quinces are raised in abundance, and there is a large production of strawberries and cranberries. The dairy cows within the State exceed the number of horses. The output of canned milk, cream, butter, and cheese is a material item. Other live stock includes horses, swine, and sheep.

Manufacturing. The State ranks particularly high as a manufacturing community. It is surpassed only by four states in the value of manufactures, namely, New York, Pennsylvania, Ohio, and Illinois. In the output of textiles the State holds first rank. Beverly, where the first cotton mills of America were established, continues to be a center of the cotton industry. About 7,850,000 spindles are operated in the State, and the cotton output represents about one-third of the entire manufacture of this commodity of the country. Lowell, New Bedford, and Fall River are noted as centers of the cotton industry and Lawrence has large interests in the manufacture of cotton and woolen goods. Boots and shoes, both rubber and leather, are manufactured more extensively in Massachusetts than in any other State. Brockton, Haverhill, and Lynn are centers of the shoe manufacturing industry. Waltham, the seat of the Waltham Watch Company, has the largest factory of the kind in the world. Holyoke produces large quantities of paper and wood pulp. Gloucester has extensive fish canning establishments, Worcester is a center of foundries and machine shops, and Boston is famous as a printing and publishing center. Other manufactures include confectionery, sugar, furniture, jewelry, automobile accessories, cordage, clothing, rugs and carpets, butter and cheese, and slaughter-house products. Water power being an important factor in developing these enterprises, the manufacturing centers are located in various parts of the State, but the largest number of establishments are in the eastern part.

Transportation and Commerce. Boston, on Boston Harbor, is the most important railway center. A network of railways extends its lines to all parts of the State and many localities have communication by electric railway lines. The State has 4,961 miles of railways, which, together with extensive navigation facilities, give easy access to its trade centers. Much has been done to supply and maintain surfaced roads of a high class, and these extend from the cities to nearly all sections of the State.

In commerce the State holds second rank, being exceeded only by New York. Steamers ply regularly between Boston and the leading ports of Europe and America. Twelve ports of entry are maintained, those of Barnstable, Boston, Charlestown, Fall River, Gloucester, Marblehead, New Bedford. Beverly, Salem, Newburyport, Edgarton, and Plymouth. These ports in the aggregate carry a large commerce and handle products that come from and are shipped to many points inland. Among the chief exports are fish, cereals, dressed meats, clothing, cotton, and lumber, and the imports include fibers, wool, hides, and metals.

Government. The constitution of the State was adopted in 1780, but a number of amendments have been added at different times. All the executive officers of the State, including the Governor, are elected for a term of two years. The Governor is aided by a council of eight members and, in the case of a vacancy, he is succeeded by the Lieutenant Governor. A general court, composed of a senate of forty members and a house of representatives of 240 members, constitutes the legislative authority. All the members are elected for two years on the Tuesday following the first Monday in November, in even numbered years, and the Legislature convenes annually the first Wednesday in January. The Governor, with the advice of the senate, has the power to appoint the judges, who remain in office during good behavior. The judiciary consists of a supreme and a superior court, the former being presided over by a chief justice and six associates and the latter by a chief justice and 31 associates. Probate and insolvency courts are maintained in each county, and municipal and district courts have jurisdiction in the towns and cities. Government by township originated in Massachusetts, where the annual town meeting chooses the officers to preside over the town.

Education. The Massachusetts Board of Education consists of the Governor and the Lieutenant Governor, ex-officiis, and eight other persons who serve without pay, one of whom is appointed annually in May by the Governor,

with the advice and consent of the council, for a term of eight years. This board has the management and control of the ten normal schools and the supervision of the education of State beneficiaries in schools for the deaf and blind. However, the board has no direct jurisdiction over the public schools, but it may, and in practice does, to some extent through its own members and in a large way through its secretary and agents, call local attention to such laws, court decisions, and principles as should be heeded in the local management of the schools. And it is the practice of the local school committees to consult the board or its officers on doubtful points in school administration. Reports are made annually to the Legislature by the board and its secretary upon the condition and efficiency of the public school system, in connection with which recommendations are made in regard to practicable means of improving and extending instruction. The secretary of the board, whose duties are similar to those of State superintendents in other states, is appointed annually by the board. He has immediate supervision of from twenty to thirty teachers' institutes that are held annually throughout the State.

Massachusetts has a State school fund amounting to $5,000,000, the income of which is distributed to towns under a valuation of $2,500,000 each for the support of public schools. The system of supervision by skilled superintendents of schools is compulsory. Any town under a calculation of $2,500,000 must unite with another town or other towns for the employment of a superintendent of schools. The superintendents of these unions in which each town is aided by the State are examined by the State board of education. State aid to the extent of $500 each is given to towns under 500 families maintaining high schools. All schools over 500 families must maintain high schools. All high schools are subject to the approval of the State board of education before State aid of any kind is given. Each town and city has a school committee, must raise by taxation money necessary for the support of schools, and is required to appoint truant officers to see that the school laws are enforced. Medical inspection of schools is required by a law passed in 1906. The compulsory school age is from 7 to 14 years.

Although Massachusetts has no State university, higher education is amply provided for by numerous institutions of learning. These include Harvard University, Cambridge; Williams College, Williamstown; Amherst College, Amherst; Mount Holyoke College, South Hadley; College, of the Holy Cross, Worcester; Tufts College, Medford; Massachusetts Institute of Technology, Boston; Boston College, Boston; Massachusetts Agricultural College, Amherst; Worcester Polytechnic Institute, Worcester; Boston University, Boston; Wellesley College, Wellesley; Smith College, Northampton; Clark University, Worcester; and Simmons College, Boston. Danvers, Northampton, Medford, Taunton, Westboro, and Worcester have hospitals for the insane. Reformatories are maintained at Concord and at Sherborn. Boston has the State prison, a school for the deaf, and two schools for the blind. A school for the deaf is likewise located at Northampton.

INHABITANTS. Massachusetts is the most densely populated State in the Union, having 479 persons to the square mile. The large per centage of increase in the last few decades may be attributed to the development of its manufacturing enterprises. Formerly the people were almost entirely of English descent, but at present the non-English type predominates. This is due to a large immigration from Canada and Europe. Those of foreign birth include principally Irish, Germans, French, Italians, and Jews. Fifty-six towns have a population of more than 8,000 inhabitants, and this is a larger number than in any other State. Boston, the capital, is the largest city and most important seaport of New England. Other cities include Worcester, Fall River, Lowell, Cambridge, Lynn, Lawrence, New Bedford, Springfield, Somerville, Holyoke, Brockton, Haverhill, Salem, Chelsea, Malden, Newton, Fitchburg, Taunton, and Gloucester. In 1900 the State had a population of 2,805,346. This included a colored population of 35,582, of which 31,974 were Negroes. In 1920 the population was 3,852,356; in 1925, 4,144,205.

HISTORY. Massachusetts was named from an Indian word meaning "the great hills," a term derived from the Blue Hills near Boston. It is thought that the Norsemen first sighted the shores of Massachusetts Bay in the year 1001. The Cabots explored a portion of its coast in 1497, but extended explorations were first made by John Smith in 1614. In 1620 the Pilgrim Fathers landed with the *Mayflower* at Plymouth, where the first permanent settlement was made. John Endicott settled with a company of Puritans at Salem in 1628 and this settlement, with those of Boston, Lynn, and other places, became known as the Massachusetts Bay Colony. War with the Indians caused the colonists to suffer many hardships, especially those with the Pequots in 1637 and under King Philip from 1675 until 1676. The Puritan religion was made obligatory in the early history of Massachusetts, and laws requiring some form of worship continued in force until 1833. In the Revolutionary War the State was recognized as a leader, the first battles occurring at Lexington and Bunker Hill. It entered with enthusiasm into the War of 1812, supported the Union cause in the Civil War, and has given to the nation many eminent statesmen and military leaders.

Massachusetts has been foremost in many educational and political movements. Higher education was provided for as early as 1636, when Harvard University was founded at New Town, now Cambridge, and which continues to rank

among the leading centers of learning in America. The movement to abolish slavery began here as early as 1780, when the Bill of Rights prefixed to the constitution practically abolished it. Amherst College was established in 1821, and the State board of education was established soon after, at the head of which Horace Mann made popular the system of public instruction by the states. William Lloyd Garrison and others were prominent factors in spreading the movement for the abolition of slavery in the Union. In 1873 the State completed the construction of the Hoosac Tunnel, the most important public improvement in the Commonwealth. A movement to reduce the working day from twelve hours was begun in 1853 and since the State has greatly improved the condition of the working classes. It has given more than ordinary attention to the regulation of corporations, the civil service, the liquor traffic, and the government of municipalities.

MASSACHUSETTS BAY, a coast indentation of Massachusetts, extending from Cape Ann to Cape Cod. It has an irregular coast, includes numerous small islands, and within its coast lines are Cape Cod Bay, Plymouth Bay, and Boston Bay. The bay is important for its commerce and fisheries.

MASSACHUSETTS BAY COLONY, a colony founded at the present site of Salem, Mass., in 1628. It was promoted by the Massachusetts Company, who received a grant on March 19, 1628. The territory extended from the Atlantic to the Pacific Ocean, and in width from a line running three miles north of the Merrimac to one running three miles south of the Charles. John Humphrey and John Endicott were the most prominent members of the company. The latter was sent from England in 1628 and made a settlement at Naumkeag, now Salem, and the next year a charter was granted that constituted the law of the colony for 55 years. The chief officers consisted of the Governor and thirteen councilors. Since the Puritans were in a majority, much controversy arose on account of religious differences, and because of it many prominent members left the colony and took a prominent part in establishing Connecticut, New Hampshire, and Rhode Island.

MASSACHUSETTS INDIANS, the Indians found in the territory included in Massachusetts. They consisted of five Algonquin tribes. The lands around Massachusetts Bay were inhabited by the tribe known as the Massachusetts; the Nipmucks resided in the central portion; the Pennacooks, in what is now New Hampshire; the Pokanokets, in the southeastern part of the State; and the Nausets, in the vicinity of Cape Cod. All except the Nausets were friendly to the colonists, but this tribe entered into a treaty of peace with the Plymouth settlers. In 1644 missions were established on Martha's Vineyard. John Eliot soon after collected the converted Indians, who were termed praying Indians, into a settlement at Natick, having previously translated the greater part of the Bible into the Indian language. In 1674 there were 3,200 who had embraced Christianity. King Philip organized an insurrection in 1675, when all the Massachusetts Indians became participants, and both whites and converted Indians were attacked by the savages. The war ended the following year with the death of King Philip, after which some of the leading members were sent to the West Indies, others settled westward and in Canada, and those remaining became peaceable. Many of these Indians lost their identity by intermarrying with whites and Negroes.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, a noted scientific and industrial institution in Boston, Mass. It was founded in 1861, but the regular courses of instruction were not opened until the close of the Civil War, in 1865. This institution was the first school of the kind opened in the United States and was a pioneer in the adoption of laboratory methods. The sixteen distinct courses, each covering a period of four years, include chemistry, architecture, biology, physics, civil engineering, mining engineering and metallurgy, mechanical engineering, electrical engineernig, chemical engineering, sanitary engineering, geology, general studies, and naval architecture. Postgraduate courses are maintained in a number of the departments, and all of the work is affiliated with the view of giving strength and support to the entire system. The degree of bachelor of science is awarded to the student who completes any one of the courses. At present the value of the property is placed at $12,500,000 and the institution has an endowment of $28,000,000. About 350 professors and instructors are included in the faculty. The attendance averages 2,750 students, who represent all of the states and many foreign countries. The library has 170,500 volumes and pamphlets.

MASSAGE (măs'säj), a method of treating the body for the cure of diseases. It consists of systematic manipulations, including surface friction, kneading, manipulations with the tips of the fingers, and striking or percussion with the hands. These procedures are administered daily and are combined, or interchanged, according to definite rules, the treatment varying as may seem best from the nature of the disease and the locality affected. Massage has been found of much service in treating rheumatism, paralysis, neuralgia, joint diseases, diabetes, and many other ailments.

MASSASOIT (măs'sa-soit), an Indian chief of the Pokanokets, or Wampanoags, born in Massachusetts about 1580; died in 1661. The tribe over which he had control occupied the region from Narragansett Bay to Cape Cod Bay. It numbered about 25,000, but many of the members died of a contagious disease before permanent settlements were made. In 1621 a

treaty of peace was made with the whites under his approval, and was honorably kept by the Indians affected by it for 54 years. Massasoit was honorable in dealing with the whites. He uniformly displayed a spirit of friendliness and cultivated the arts of peace. He resided in the vicinity of what is now Warren, R. I., where he was visited by numerous commissioners from the settlements. Massasoit entertained Roger Williams after his banishment from Massachusetts, the latter remaining with the Indians for several weeks before going to Providence. Alexander and King Philip were his sons, the latter being the famous leader of King Philip's War.

MASSÉNA (mä-så-nä'), **André,** marshal of France, born at Nice, Italy, May 6, 1758; died April 4, 1817. He descended from parents in humble circumstances, became a cabin boy on a small vessel, and in 1772 joined the Sardinian army. In 1775 he enlisted in a battalion of volunteers in the pay of France. He resigned in 1789, but reëntered the army at the outbreak of the French Revolution. Soon after he distinguished himself by commanding the French army in Italy, winning the famous victory of Loano while in charge of the right wing of the army. He secured command of the army in Switzerland in 1799, defeated the Russians at Zurich, thereby making invasion of France impossible, and in 1804 Napoleon rewarded him by appointing him commander of the army of Italy and marshal of the empire. At the Battle of Aspern he showed much bravery. In 1810 he compelled the British and their allies to retreat to Lisbon, but, being unable to defeat Wellington at Torres Vedras, he resigned his commission. However, he held an important command during the Russian campaign, but after Napoleon's return from Elba he refused to accept positions of responsibility, and soon after went over to the Bourbons, who created him a peer, a rank confirmed by Louis XVIII. Masséna ranks as one of the most efficient generals under Napoleon. He was quick to comprehend the advantages of situations and executed his designs with masterful accuracy. Napoleon created him Duke of Rivoli and later Prince of Esslingen, and, when he refused to further champion Napoleon's cause, the royalists made cruel attacks upon him and apparently forgot his able support when success was possible for the royal cause.

MASSENET (mä-s'-nä'), **Jules Émile Frédéric,** composer, born at Montaud, France, May 12, 1842; died Aug. 13, 1912. He studied in Paris and in the meantime supported himself by giving music lessons. In 1859 he was awarded the first prize and in 1863 he secured the grand prize of Rome. In 1878 he became a professor at the Conservatory, which position he held for eighteen years. His compositions are very numerous and are prized for their fine instrumentation. They include a number of operas, cantatas, oratorios, and orchestra suites. Those best known include "Sapho," "Le Cid," "Marie Magdeleine," "Herodias," and "Don César de Bazan."

MASSEY (măs'sĭ), **Gerald,** poet, born in Tring, England, May 29, 1828; died Oct. 29, 1907. He descended from poor parents, received only a limited education, and began to work in a silk factory when eight years of age. In 1843 he became an errand boy in London, six years later was made editor of the *Spirit of Freedom,* and became recognized as a leading Christian Socialist. His "Ballad of Babe Christabel and Other Poems" appeared in 1854 and before the end of the year went through five editions. In 1852 he attracted attention as a lecturer on spiritualism and hypnotism and visited America, Australia, and many countries of Europe, everywhere attracting interested audiences. His writings embrace "Concerning Spiritualism," "Tale of Eternity and Other Poems," "Robert Burns and Other Lyrics," "My Lyrical Life," and "The Secret Drama of Shakespeare's Sonnets."

MASSILLON (măs'sĭl-lŏn), a city of Ohio, in Stark County, on the Tuscarawas River, eight miles west of Canton. It is on surfaced highways, and on the Pennsylvania, the Baltimore and Ohio, and other railroads. The surrounding country is fertile and has deposits of bituminous coal. Among the noteworthy buildings are the high school, the public library, and the State Hospital and Asylum for the Insane. The manufactures include threshing machines, iron bridges, hardware, engines, glass, flour, and machinery. It has electric lights, a sanitary sewer system, waterworks, street railways, and brick and asphalt pavements. Massillon was settled in 1825 and incorporated in 1853. Population, 1900, 11,944; in 1920, 17,428.

MASSILLON (mä-sē-yôn'), **Jean Baptiste,** noted clergyman, born at Hyères, France, June 24, 1663; died at Clermont, Sept. 18, 1742. In 1681 he entered the Congregation of the Oratory for the purpose of studying theology, a line of work for which he had shown a preference from his early youth, and afterward became a teacher of theology. His first pulpit essay was prepared at Vienne, and a funeral oration on the Archbishop of Vienne gave him a reputation among the superior pulpit orators of France. In 1699 he preached for the first time before Louis XIV., who was deeply impressed with his eloquence. He was made Bishop of Clermont in 1717, was appointed to preach before Louis XV. in the same year, and two years later was elected a member of the Academy. The funeral oration of the Duchess of Orleans, in 1723, was his last public discourse in Paris, after which he took an active part only for his diocese. Among the many excellent sermons delivered by this noted divine are his discourses on "The Death of the Just and Unjust," "For Christians," and "The Prodigal Son." The complete works of Massillon were published in fourteen volumes in 1845.

MASSON (măs'sŭn), **David,** author and educator, born in Aberdeen, Scotland, Dec. 2, 1822; died Oct. 6, 1907. He studied at the University of Edinburgh, began a literary career at the age of nineteen, and in 1859 was made editor of *Macmillan's Magazine.* In 1865 he was appointed professor of rhetoric and literature in the University of Edinburgh, became Rhind lecturer in 1875, and contributed many articles of value to various publications. His writings include "Life of John Milton," "Essays, Biographical and Critical," "British Novelists," "Recent British Philosophy," and lives of Shelley, Keats, and Wordsworth.

MAST. See **Ship.**

MASTER AND SERVANT, in law, the term applied to the relationship between two parties, one of whom is engaged to perform certain duties for the other in consideration of remuneration. Two classes of servants are usually recognized, including those known as apprentices and those distinguished as employees. An *apprentice* is a person bound in due form of law to a master under the condition that he is to receive certain compensation and at the same time learn from him his art, trade, or business. One of full age may bind himself as an apprentice, but a minor cannot be so bound without the consent of his parents or guardian. Recently legislation has been enacted in England and the United States to define and fix the responsibility of employers for the acts and offenses of their servants. This is generally known as the employers' liability acts. Considerable discussion arose on account of it during the presidential election of 1908, President Roosevelt having called the attention of the Congress to the advisability of more definite legislation by addressing several special messages to that body. The legislation more recently enacted enlarges the responsibility of employers by making them liable for certain actions of one servant against the other, especially for those of superior employees to those working under them as subordinates.

Among the essential rules governing the relations of master and servant are that the former may recover damages from a third party for injuries to his servants, provided they caused the loss of services. The death of the master works a dissolution of the apprenticeship, unless otherwise provided in the contract, or unless the apprentice elects to continue his service. In case of a dissolution under such conditions, the apprentice is entitled to receive reasonable allowance for his services previously rendered, but, if a contract is broken by an *employee* without justification, he cannot recover compensation for services already rendered. The master may discharge an employee for disobedience, immorality, or gross negligence and incompetence, but if he is discharged without good and sufficient cause the master is liable for unpaid wages and reasonable damages. The servant may recover damages for injury or loss sustained through the neglect of the master to provide suitable conditions or instruments, provided that the employer knew of the danger and had received notice of it within a reasonable time. Third parties may recover damages from the employer for offenses committed by his servants, provided the act complained of was committed within the scope of relationship between the master and servant.

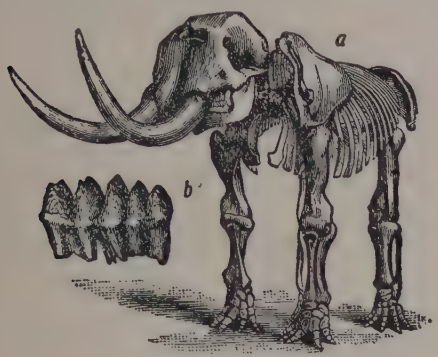
MASTER OF ARTS, a degree conferred by colleges and universities to certify scholarship in the arts. It is the highest degree in the faculty of arts and follows a *bachelor's* degree, but is inferior to those of *bachelor of divinity* and *doctor of philosophy.* This degree was issued in Germany as early as the 12th century. It is now given in most countries after pursuing a course of study and passing an examination in mathematics, history, languages, physics, and philosophy. At present there is a wide range of difference in the requirements of different schools, since there is no general agreement as to what constitutes the necessary experience and scholarship for this and other degrees.

MASTERSINGERS, or **Meistersingers,** the name of a class of minstrels who flourished in Germany during the period from the 14th to the 16th centuries. They combined the qualities of poets and singers, and in the reign of Emperor Charles IV. were formed into guilds or associations. The imperial cities, such as Mentz and Nuremburg, were noted as seats of these associations, and in the latter city they flourished most successfully and were longest supported. Their compositions consisted chiefly of devotional and scriptural pieces, mingled with the burgher expressions of local characteristics. In public contests a board of judges sat to hear the poems recited or sung, the purpose being to criticise the prosody, rhymes, and tunes, and to compare the compositions with the text of the Bible. A prize was given to the one who produced the best composition and acted with the greatest skill, and successful competitors were permitted to receive apprentices. Hans Sachs (q. v.) was the most famous of the Mastersingers and stands high in the list of these singers and poets. The associations declined rapidly after the 16th century, but one at Ulm flourished until 1839. Other forms of singing societies, such as the *Sängerbünde* and the *Liederkränze,* succeeded the Mastersingers in modern times.

MASTICATION (măs-tĭ-kā'shŭn), the process by which the food is divided and mixed with the salivary secretion, preparing it for the further action of the stomach. Mastication is performed by means of the lips, teeth, and mouth, and digestion depends largely upon its thoroughness. Indigestion often results from imperfect mastication. In infants and the lower animals it is instinctive, but in adults it is largely voluntary.

MASTIFF (măs'tĭf). See **Dog.**

MASTODON (măs'tō-dŏn), a genus of elephants now extinct, but of which fossil remains occur in America as late as the Post-Pliocene period. In Europe and Asia they occur from the middle of the Miocene to the end of the Pliocene, when the animals became extinct. The mastodons closely resembled existing species of elephants, differing from them mainly in the formation of the teeth. They had a vaulted and cellular skull, large tusks in the upper jaw, and



MASTODON.
a, skeleton; *b*, molar tooth.

a heavy form. Remains found in America indicate that they approximated a height of twelve feet and a length of eighteen feet. The first complete skeleton found in America was secured in Orange County, New York, in 1801.

MATABELELAND (măt-ā-bĕ'lē-lănd), a district in the southeastern part of Rhodesia, forming an important part of British South Africa. It extends about 200 miles north of the Limpopo River, by which it is separated from the Transvaal Colony. Buluwayo, the capital, is connected with Cape Town by a railway. The region was placed in the British sphere of influence in 1888.

The natives are known as Matabele. They are Zulus of Bantu stock. In 1827 they removed from Transvaal and Natal to their present location. These people engage chiefly in stock raising, but have made some advancement in cultivating maize, tobacco, and vegetables. The men are expert horsemen and hunters and engage in making pottery, utensils, and battleaxes. The native population is about 40,000. In 1922 Matabeleland had a population of 158,500.

MATAMOROS (măt-ā-mō'rŏs), a city of Mexico, in the state of Tamaulipas, on the Rio Grande opposite Brownsville, Tex. It has regularly platted streets and good transportation facilities. The trade is chiefly in cotton, silk, flax, and woolen goods, tobacco, flour, hides, and machinery. Gold is mined in the vicinity, but the surrounding country is devoted chiefly to grazing. The city was captured in 1846 by an American force under General Taylor. Population, 1922, 12,042.

MATAMOROS, Mariano, revolutionary leader and patriot of Mexico, who was among the first to head the revolution against Spain. His birth and early life are unknown. The first authentic date occurs in 1811, when he was a priest at Jantelolco and became colonel of the military forces in defense of Cuautla. While there he was aided by his fellow priest, Morelos, and in 1813 defeated the imperial forces at Augustin de Palmas. Later his forces were repulsed at Valladolid, owing largely to a rash movement led by Morelos, and later at Puruaran, where Matamoros was taken prisoner in 1814. The Spanish general refused to exchange him for 200 prisoners and he was shot Feb. 3, 1814, at Valladolid. Morelos immediately executed the 200 prisoners, as a retaliatory measure. Matamoros is regarded the ablest leader of the first revolution and is so designated in Alaman's "History of Mexico." The city of Matamoros was named in his honor. His remains are preserved in the cathedral of the city of Mexico, together with those of the other two leaders, Morelos and Hidalgo.

MATANZAS (mȧ-tăn'zȧs), a seaport of Cuba, capital of the province of Matanzas, 44 miles east of Havana. It is extensively connected by railways, has a fine harbor on the Bay of Matanzas, and has been greatly improved since the Spanish-American War. Among the features are a public library, the government buildings, the Estéban Theater, and several fine schools and churches. It has manufactures of tobacco products, sugar, clothing, and machinery. The export and import trade is of growing importance, embracing principally sugar, coffee, cigars, spirituous liquors, machinery, utensils, fabrics, and earthenware. Three miles east of the city are the caves of Bellamar, in a range of rocky hills. The place was settled in 1693, but the city is of modern development. Population, 1909, 46,329; in 1921, 56,053.

MATCHES, the articles manufactured for the purpose of starting a fire, consisting principally of splinters of soft wood tipped with a combustible composition that ignites by friction. Fire for domestic and other purposes was obtained up to the beginning of the last century with sulphur-tipped splints of wood, which were lighted with tinder ignited by steel and a flint. Attempts to use a chemical agency were not made until 1805, when splints of wood were coated with sulphur and tipped with a mixture of sugar and chlorate of potash. To obtain fire it was necessary to bring the match in contact with the contents of a bottle consisting of asbestos, saturated with strong sulphuric acid. The first friction match with a phosphorus tip was made in France in 1816, but friction matches did not come into general use until in 1827, when John Walker, a druggist of Stockton, England, invented a wooden match tipped with sulphur and a mixture of sulphide of antimony, chlorate of potash, and gum. Several improve-

ments were made in 1833, and since then the manufacture has been largely by labor-saving machinery.

In 1855 the first *safety matches* were made in Sweden. They are so formed that the tips contain only a part of the necessary composition, the other ingredients required being attached to the box, thus making it necessary to bring the two in contact when lighting. Matches of this character are used extensively on account of not being liable to ignite in case of friction by accident. The wood employed in match making is largely pine and aspen. It is cut into splints by forcing blocks of the proper length through steel plates containing small holes of the exact size of a match. After being cut, the splints are fed into machines for dipping the ends into the igniting composition. The important element of the igniting composition is phosphorus, but there are various special mixtures used by different manufacturers. Usually the igniting composition is spread in a shallow basin, into which the tips are dipped, and, after proper drying the matches, they are placed in pasteboard boxes for the market. The poisonous property of phosphorus requires much care in the process of manufacturing and in using these matches, since accidents are liable to result, especially from carelessly placing them in reach of children. The match-making industry has assumed large proportions in Sweden, Norway, Germany, Great Britain, and the United States.

MATE (mā'tā), or **Paraguay Tea,** the name of a small tree native to South America, where it is grown for its leaves, which are used as a substitute for tea. This plant is of the holly family. It has smooth leaves and small flowers, and the physiological effects resemble those of coffee. It is cultivated extensively in Brazil, Paraguay, and other countries of South America. The small branches are cut off and dried, after which the leaves are removed and when thoroughly dry are packed in bundles for the market. Mate is used extensively as a beverage. It is made by steeping the leaves in boiling water in the manner of making tea. Those accustomed to it like its flavor, though the taste is not like that of tea.

MATERIALISM (mȧ-tē'rĭ-ạl-ĭz'm), the philosophy that denies the existing of any immaterial part in man and accounts for the universe, embracing man and the systems of nature, by matter alone. Materialism has been divided into two classes, perfect and imperfect materialism. *Perfect materialism* affirms that there is but one substance in the universe, and that substance is matter. *Imperfect materialism* is of two classes. One of these admits a spirit in man, but none in the universe; while the other admits a spirit in the universe, but none in man. It may be said there are numerous schools of materialists, the lines varying from theories scarcely distinguishable from spiritualism to those of persons who, like Jacob Moleschott (1822-1893), believe that the brain secretes thought as the liver secretes bile. The latter class generally holds to the view that there is no matter without force, and no force without matter.

MATERIA MEDICA (mȧ-tē'rĭ-ȧ mĕd'ĭ-kȧ), that department of medical science which treats of the different medicines employed for curative purposes. Some writers divide the subject according to the use of organic and inorganic substances, while others employ an alphabetical arrangement in outlining and describing all the different substances which are considered of utility in treating diseases. The latter classify them in regular order according to their modes of operation and their effects upon the human body. Materia medica embraces both therapeutics and pharmacology.

MATHEMATICS (măth-ē-măt'ĭks), the science that treats of quantity, the measuring of quantities, and the ascertainment of their properties and relations. It is divided into pure and mixed mathematics. *Pure mathematics* investigates the properties of abstract numbers and magnitudes. It embraces arithmetic, algebra, geometry, trigonometry, calculus, and other sciences. *Mixed mathematics* is used in all the physical sciences, such as electricity, magnetism, optics, logic, and economics. In both pure and mixed mathematics the treatment may be by synthesis or by analysis. See **Algebra; Arithmetic; Geometry,** etc.

MATHER (măth'ẽr), **Cotton,** clergyman and author, son of Increase Mather, born in Boston, Mass., Feb. 12, 1663; died Feb. 13, 1728. When sixteen years of age, he graduated at Harvard College and in 1684 was ordained assistant minister to his father at the North Church in Boston. The following year he published his "Memorable Providences Relating to Witchcraft and Possessions," a work considered authoritative in dealing with the Salem witchcraft persecutions. It was quite influential in causing the burning of nineteen victims at Salem in 1692. Another work having a widespread influence in these persecutions was his "Wonders of the Invisible World," in which he undertook to prove that witchcraft is a reality. Mather was probably the most learned man in America at the time in which he lived. He had a wide acquaintance with books and foreign languages and was an aggressive worker in the interest of temperance. His industry and learning were attested by the publication of 382 books, many of which were read by Franklin and other eminent men. His greatest work is "Magnalia Christi Americana," a church history of New England published in 1702. Another work widely read is his "Essays to do Good."

MATHER, Increase, clergyman and educator, born in Dorchester, Mass., June 21, 1639; died Aug. 23, 1723. In 1656 he graduated at Harvard and two years later at Trinity College, Dublin. In 1661 he was ordained a minister

and preached the gospel in Devonshire and Guernsey, but soon after returned to America, and in 1664 became pastor of the North Church, Boston, in which position he remained until his death. He was president of Harvard from 1685 to 1701. When Charles II. annulled the Massachusetts charter, in 1684, he zealously opposed that sovereign, and was commissioned by Massachusetts to proceed to England for the purpose of securing a new charter for the colony, which he did in 1698. The new charter gave him authority to appoint officers, a task he performed with the greatest public concern. He published 92 separate works, labored sixteen hours a day, and was alike influential in the church and state. Few of his publications are now extant. The most important are "History of the War with the Indians," "Life of Richard Mather," and "Remarkable Providences." He married a daughter of John Cotton.

MATHEW (măth'ū), **Theobald,** temperance reformer, born at Thomastown, Ireland, Oct. 10, 1790; died Dec. 8, 1856. He studied at the Catholic College of Kilkenny, in 1807 entered the College of Maynooth, and took priest's orders in 1814 in the religious order of the Capuchins. He was first located at Cork, where he entered with much zeal upon the encouragement of total abstinence, and later wielded a marked influence in temperance crusades in various cities of Great Britain and in New York. It was his custom to present medals to all who would take the pledge of total abstinence, a course by which many lives were reformed. He founded schools for children, effected social reforms, and contributed liberally to charities. A statue was erected to his memory in Cork, Ireland, and another in New York City.

MATHEWS, William Smythe Babcock, musician, born in Loudon, N. H., May 8, 1837. He was instructed by private teachers, taught music at Macon, Ga., and later did similar work in Alabama and North Carolina. In 1867 he became organist of the Centenary Methodist Church in Chicago, which position he filled until 1893. In the meantime he corresponded for *Dwight's Journal of Music* and was editor some years of the *Musical Independent.* His chief writings on music include "One Hundred Years of Music in America," "Popular History of Music," "How to Understand Music," and "Outlines of Musical Form." He joined Emil Liebling in publishing the "Pronouncing Dictionary of Musical Terms." He died April 1, 1912.

MATSYS (mät-sīs'), **Quentin,** Flemish painter, born in Louvain, Belgium, about 1460; died in Antwerp in 1530. His natural ability as a painter was recognized at an early age, having produced numerous specimens of much merit. In 1491 he settled at Antwerp, where he executed most of his works of excellence. He ranks not only as a noted painter of scriptural scenes, but holds a high place as a portrait painter and executed a number of frescoes. The fine finish of his productions as well as their coloring is remarkable. Among the most important are "Martyrdom of John the Baptist," "Burial of Christ," "Money Changers," and "Virgin and Child." In the noted galleries of Europe are seventy pictures ascribed to him.

MATTEAWAN (măt-tê-à-wŏn'), a village of New York, in Dutchess County, 44 miles north of New York City. It is located on Fishkill Creek, about two miles from the Hudson River, and has transportation facilities by the New York Central Railroad via Beacon, with which it is united for postal and other purposes. Waterworks and electric lighting are among the public utilities. It is the seat of a hospital for the insane, several village hospitals, and the Howland Library. The manufactures include machinery and cotton textiles. It was founded in 1814 and recently merged with Beacon, which in 1920 had a population of 11,621.

MATTER, in physics, anything which occupies space and prevents other matter from occupying the same space at the same time. It is the agent through which force is manifested. By its properties matter is made manifest through the senses, though the intermolecular and interstellar ether is regarded as matter, but is not perceived by the senses owing to its subtlety. The three forms of matter are *solids, liquids,* and *gases.* All of these forms have volume; that is, length, breadth, and thickness. Two classes of theories are held as to the ultimate constitution of matter—the theory that regards it as made up of atoms and the one which considers it as a homogeneous plenum, the former being now generally accepted by scientific men. *Matter* and *mind* are commonly regarded as antithetical.

MATTERHORN (mät'tĕr-hôrn), a peak of the Alps, called Mont Cervin by the French and Monte Silvio by the Italians. It is located on the boundary line between Switzerland and Italy and has an altitude of 14,780 feet. The peak is very steep. It was first scaled by Lord Francis Douglas and several guides on July 14, 1865, when Douglas and three others were killed by falling over a precipice.

MATTHEW (măth'ū), **Saint,** one of the twelve apostles of Jesus, held to be the author of the gospel that bears his name. He was the son of Alpheus and served as gatherer of Roman customs at Capernaum, on the shore of the Sea of Galilee, whence he was called to follow Jesus. His name is mentioned with the list of the disciples and he is thought to have died a natural death, but some of the later traditions represent him as having been martyred after preaching in Parthia and Ethiopia. The book of Saint Matthew is addressed especially to the Christians of Jewish descent. This highly important work is thought to have been published between 41 and 60 A. D., and is the only one of the four gospels that reports at length the Sermon on the Mount. It likewise gives prominence to other discourses

of Jesus and details the ministry of Christ in Galilee rather than at Jerusalem.

MATTHEWS, James Brander, author and critic, born in New Orleans, La., Feb. 21. 1852. He graduated at Columbia College in 1873, and shortly after settled in New York to pursue literary work and criticism. He became professor of dramatic literature at Columbia College in 1892. His writings include "Americanisms and Briticisms," "The Theaters of Paris," "Vignettes of Manhattan," "The French Dramatists of the Nineteenth Century," "Introduction to the Study of American Literature," "The Philosophy of the Short Story," and "A Confident To-Morrow."

MATTHEWS, Stanley, statesman and jurist, born in Cincinnati, Ohio, July 21, 1824; died in Washington, D. C., March 22, 1889. In 1840 he graduated at Kenyon College, was admitted to the bar, and soon after removed to Cincinnati, where he became connected editorially with the *Herald*. Subsequently he was elected judge of Hanover County, became State senator, and served as United States attorney in Ohio from 1858 to 1861. In 1861 he volunteered in the Union service, rose to the rank of colonel in the army of the Cumberland, and resigned in 1863 to serve as judge of the Cincinnati superior court. The Republicans retained him as counsel before the electoral commission in 1877, and in the same year he succeeded John Sherman as United States Senator. President Garfield appointed him associate justice of the United States Supreme Court in 1881, a position he held until his death. He is noted as an able jurist, many of his decisions giving evidence of much ability.

MATTHIAS (mȧ-thī'ȧs), **Corvinus,** King of Hungary, second son of John Hunyady, born at Klausenberg, Hungary, March 27, 1443; died in Vienna, Austria, April 6, 1490. His father served as regent of Hungary and Ladislaus, King of Hungary and Bohemia, kept him and his brother prisoner in Bohemia. After the death of that king and his brother, Matthias was chosen King of Hungary by the magnates in 1458, but before establishing his supremacy he was compelled to struggle six years against the Turks, Frederick III. of Germany, and the Bohemians. His first ambition was to expel the Turks from his kingdom, which he did, and as a consequence annexed Moldavia, Bosnia, and Wallachia. Next he proceeded against the Bohemians, annexing the territory included in Silesia, Lusatia, and Moravia, in 1478. The following year he again organized an expedition against the Turks and at Kenyermezo inflicted a decisive defeat upon them. His last notable campaign was that of 1485 against the Germans and Austrians, in which he captured city after city until Vienna was conquered, which he made his capital. Matthias was not only a skilled commander, but a patron of education. He established many institutions of learning, among them the University of Budapest, and surrounded his court with the most eminent men of Germany and Italy. He encouraged agriculture, manufacture, and commerce, and placed in his court splendid sculptures and a library of 50,000 volumes. His death resulted from apoplexy while he was enjoying the height of prosperity. "King Matthias gone, justice gone," became a common saying after his death.

MATTOON (mȧt-tōōn'), a city of Illinois, in Coles County, in a fertile agricultural country, 55 miles west of Terre Haute, Ind. It is on the Illinois Central and the Cleveland, Cincinnati, Chicago and Saint Louis railroads. Among the principal buildings are the public library, the high school, and the Odd Fellows' Home. It has manufactures of brick, tile, machinery, brooms, earthenware, wagons, and utensils. Other industries include the repair shops of the Big Four and the Illinois Central railroads. Mattoon was settled and incorporated in 1855. Population, 1900, 9,622; in 1920, 13,419.

MAUCH CHUNK (mąk chŭnk'), a borough of Pennsylvania, county seat of Carbon County, on the Lehigh River, 45 miles northwest of Easton. It is on the Lehigh Canal and on the Central of New Jersey and the Lehigh Valley railroads. Large quantities of anthracite coal are mined in the vicinity. The notable buildings include the high school, the Y. M. C. A. building, and the Dimmich Memorial Library. The place was founded in 1818 and incorporated in 1850. It is connected by railway with Summit Hill, at which burning mines have existed since 1858. Population, 1920, 3,666.

MAULMAIN (mąl-mīn'), or **Moulmein,** a seaport city of Burma, capital of the Amherst district, on the Gulf of Martaban, an inlet from the Bay of Bengal. It is situated on the Salwin River, at the point where its waters are joined by the Attaran and Gyaing rivers, and where they enter the gulf. The principal buildings include a general hospital, the public library, and several educational and charitable institutions. It has a large export and import trade, its wharves being reached by the largest vessels at the time of spring tide. The exports consist mainly of rice, hides, cotton, timber, and minerals, and the imports embrace cotton and woolen goods, machinery, and general merchandise. Shipbuilding is an important industry. Steam railways and electric lines furnish urban and interurban transportation facilities. Population, 1922, 61,306.

MAUMEE (mą-mē'), a river formed at Fort Wayne, Ind., by the confluence of the Saint Mary's and Saint Joseph rivers, whence it flows northeast into Lake Erie, at Toledo. The length is 150 miles. Ordinarily it is navigable for ten miles and during high water about fifty miles, or to Defiance, Ohio. A large part of its course is paralleled by the Miami and Erie Canal, which connects Lake Erie with the Ohio River.

MAUNA KEA (mou'nä kā'ä), the highest mountain peak of the Hawaiian Islands, situated on the island of Hawaii, about fifteen miles from the northeastern coast. It is an extinct volcano, has snow at the peak nearly the entire year, and is 13,805 feet above sea level.

MAUNA LOA (mou'nä lō'ä), an active volcano of the Hawaiian Islands, elevated 13,758 feet above sea level. It is situated near the center of the island of Hawaii. Fine forests surround the lower altitudes. The craters are numerous, the central one being about 1,000 feet deep and 8,000 feet in diameter, and new openings are not infrequent. Among the celebrated eruptions of recent years are those of 1880 and 1887, the stream of lava in the latter extending fully 25 miles from the seat of disturbance.

MAUNDY THURSDAY (mąn'dy), or **Holy Thursday,** the Thursday in Passion week, preceding Good Friday. It is probably named from the mandate, "A new commandment give I unto you, that ye love one another," of John xiii., 34. This day commemorates the ceremony of Christ washing the apostles' feet. In some countries the Roman Catholics wash the feet of pilgrims and food is distributed to the poor, in compliance with the phrase "take and eat."

MAUPASSANT (mō-pä-sän'), **Henri René Albert Guy de,** novelist, born at Mironesnil, France, Aug. 5, 1850; died July 6, 1893. He studied at the College of Rouen and served as a soldier in the Franco-German War. In the meantime he took up literary work under the counsel of his uncle, Gustave Flaubert, and became a writer of the naturalistic school. His first play was written in 1879, which was followed by a volume of lyrics and a short story in prose the following year. These writings caused him to grow rapidly in repute as an interesting writer, but in 1892 he became afflicted by a mental disease, from which he died in a private asylum the following year. His chief books include "The Necklace," "Tales of the Day and Night," "Father Milon," "Miss Harriet," "Mademoiselle Perle," and "Pierre and Jean."

MAURICE (mą'rĭs), Prince of Orange and Count of Nassau, eminent general, born at Dillenburg, Germany, Nov. 14, 1567; died in The Hague, Holland, April 23, 1625. He was the son of William the Silent and after his father was assassinated, in 1534, he became governor of Holland and Zealand. Later Utrecht chose him as stadtholder, and under his leadership the United Provinces expelled the Spaniards. The final victory over the Spaniards was won at Nieuport in 1600, and nine years later the independence of the United Provinces was recognized by Spain. The latter years of his reign were devoted to internal improvements and a strengthening of his claims against the pretensions of the Orange faction. He was succeeded as stadtholder by Frederick Henry.

MAURICE, Duke and Elector of Saxony, born in Freiberg, Germany, March 21, 1521; died at Sievershausen, near Lüneburg, July 11, 1553. He was the son of Duke Henry the Pious and received a liberal education as a Protestant. In 1541 he married Agnes, daughter of the landgrave Philip of Hesse, and succeeded his father as Duke of Saxony the same year. The next year he secured the favor of Charles V. by assisting him against the Turks and French. He was made Elector of Saxony in 1546 for aiding in the defeat of the League of Schmalkalden. However, Charles V. proceeded to persecute some of the Protestant princes, a fact that estranged Maurice, being himself a Protestant. Accordingly, Maurice concluded a treaty with Henry II. of France in 1551 and formed an alliance with several German princes. In 1552 John Frederick and Philip of Hesse, whom Charles held captive, were released and the Treaty of Passau was concluded, thus giving Maurice decided advantages in the establishment of religious liberty for the Protestants. Subsequently Maurice maintained his authority against the Turks and Hungarians. In 1553 he formed an alliance against Margrave Albert of Brandenburg, who refused to recognize the Treaty of Passau. The latter was defeated in a decisive battle at Sievershausen on July 9, 1553, but Maurice was mortally wounded and died soon after.

MAURICE, John Frederick Dennison, British clergyman, born in Normanston, England, Aug. 29, 1805; died April 1, 1872. He descended from a family of Unitarians, studied at Cambridge, and became a contributor of the *Athenaeum* at London. In 1837 he joined the Church of England and the following year was ordained as a priest. His first charge was at Guy's Hospital. He became professor of literature at King's College in 1840, and subsequently served as professor of theology in that institution for seven years. From 1866 until his death he was professor of moral philosophy at Cambridge. Besides being an able minister and educator, he showed deep interest in founding educational institutions and in writing. His productions embrace "Moral and Mental Philosophy," "The Kingdom of Christ," "Prophets and Kings of the Old Testament," "Social Morality," "Religions of the World," and "The Doctrine of Sacrifice."

MAURICIUS (mą-rĭsh'ĭ-ŭs), **Flavius Tiberius,** Byzantine emperor, born in Cappadocia about 539 A. D.; executed Nov. 27, 602. In 578 Tiberius appointed him to command the army against the Persians, in which capacity he established strict discipline and attained universal respect, and in 581 defeated the Persians in a decisive battle at Constantinople. He married the daughter of Emperor Tiberius and at the death of that sovereign, in 582, succeeded him to the throne. In 602 his army revolted because the emperor refused to ransom 12,000 veterans. Phocas was elected to the throne soon after and Mauricius was executed. He encouraged commerce and institutions of learning and is the

author of a treatise on military discipline, a work which is still extant.

MAURITANIA (mą-rĭ-tā′nĭ-à), the ancient name of that portion of Northwestern Africa which corresponds to the area included in Morocco and the western portion of Algeria. It extended south to the Sahara Desert and was separated from Numidia on the east by the Mulucha River, now called the Muluya. The Romans made it a province in the year 40 A. D., the Vandals controlled it from 429 to 534, and in 650 it became an Arabian possession. Mauritania was so named from its early inhabitants, the Mauri, a tribe of Moors closely allied to the Numidians.

MAURITIUS (mą-rĭsh′ĭ-ŭs), or **Isle of France,** an island in the Indian Ocean, 550 miles east of Madagascar. The area is 705 square miles. Connected with it are several adjacent islands, the principal ones of which include Rodrigues Island, the Amirante, the Oil, the Seychelles, and the Saint Brandon islands. These smaller islands have an area of 350 square miles. Mauritius is of volcanic origin. It has coral reefs and contains a number of mountains. The surface rises gradually from the coast, culminating in its highest peak, Rivière Noire, 2,710 feet above sea level. The climatic conditions are favorable to vegetable growth, but high winds and hurricanes are not uncommon. Much of the soil is a rich vegetable mold, formerly bearing heavy forests, but now utilized largely in agriculture. Sugar is the principal product, but it has comparatively large interests in cotton, live stock, rice, maize, coffee, and many varieties of fruit.

Schools and several institutions of higher learning are maintained jointly by local taxation and government grants. The administration is by a governor and a council. The language is principally French and the religion of most of the inhabitants is Roman Catholic, but several missionary stations are maintained by the Protestants. A large proportion of the inhabitants are settlers from the East Indies and about one-third are descendants from the French. The imports include flour, grain, clothing, and machinery, and the exports consist of sugar, fiber, vanilla, aloes, and fruits. Mauritius was discovered in 1505 by the Portuguese, who found it uninhabited. In 1598 it was occupied by the Dutch, but was abandoned by them in 1710, when it became a possession of France. The French introduced the culture of sugar and other industries. In 1810 it became a British possession. It is now a crown colony of Great Britain. The seat of government is at Port Louis, a thriving city. Population, 1926, 385,205.

MAURY (mą′rĭ), **Matthew Fontaine,** naval officer and scientist, born near Fredericksburg, Va., Jan. 14, 1806; died Feb. 1, 1873. He entered the navy as midshipman at the age of nineteen, being assigned to the *Brandywine,* at the time that vessel sailed to France with General Lafayette. In 1826 he was transferred to the *Vincennes* and with it circumnavigated the globe by a cruise of four years. He became lieutenant in 1836 and was gazetted to make an exploring expedition, but in 1839 became unfitted for active service by an accident. Soon after he was placed in charge of scientific work at the Washington Observatory, where he rendered valuable service by making observations of currents of wind, publishing from time to time treatises bearing on the results of his researches. At the beginning of the Civil War he joined the Confederate army, attaining to the rank of commodore for efficient service. After the conclusion of the war he traveled through Europe and thence proceeded to Mexico, where he was made commissioner of immigration by Maximilian, but at the death of the latter returned to Virginia and became professor of physics in the military institute at Lexington. Maury added funds of vast value to the knowledge of ocean meteorology. He instituted an international conference at Brussels in 1853. His publications include "Treatise on Navigation," "Physical Geography of the Sea," "Great-Circle Sailing," and "Letters on the Amazon and Atlantic Slopes of South America."

MAUSOLEUM (mą-sŏ-lē′ŭm), a magnificent tomb of more than ordinary size. The most celebrated structure of this character was erected in 352 B. C., at Halicarnassus, in memory of King Mausolus of Caria by his widow Artemisia. This structure was regarded the seventh wonder of the world on account of its splendor, and from it the term used to designate fine sepulchers was derived. It is asserted by Pliny that its height was 140 feet.

MAX (mäks), **Gabriel,** historical painter, born in Prague, Bohemia, Aug. 25, 1840. His father, Joseph Max (1803-1854), was a noted German sculptor, who provided for the son's education in his native city. Subsequently he studied at Vienna and Munich, and in 1863 became professor in the Academy of Munich. His first notable painting was completed in 1867, entitled "The Christian Martyr," and soon after he produced "The Melancholy Nun," now in the Hamburg Art Gallery. His "Christ Healing a Child" is in the National Gallery at Berlin, and his "Last Token" is at the Metropolitan Museum of Art in New York City. Other paintings of note include "The Blind Lamp Seller in the Catacombs," "Handkerchief of Saint Veronica," "Raising of Jairus's Daughter," and "The Lion's Bride."

MAXIM (măks′ĭm), **Hiram Stevens,** inventor, born in Sangerville, Me., Feb. 5, 1840. His early schooling was limited to the common institutions of his State, but he applied himself with much concern to various inventions. At the age of 24 years he engaged in machine shops at Fitchburg, Mass., and later served as draughtsman in New York and Boston. In 1877 he began to plan electrical devices, inventing several electric lamps and a dynamo-electric machine. Later

he turned his attention to automatic guns. His first gun was exhibited in 1884 and attracted favorable mention by scientific men. This gun contains a single barrel and is capable of firing 600 shots a minute. It was afterward improved and adopted by France, England, and many other countries. He invented incandescent lamp carbons, smokeless powder, an electric current regulator, and the *Maxim noiseless gun*. Among the marks of distinction bestowed upon him are membership in the Legion of Honor by the President of France and the Grand Order Medjidieh by the Sultan of Turkey. He died Nov. 24, 1916.

MAXIMILIAN (măks-ĭ-mĭl'yạn), Emperor of Mexico, Archduke of Austria, born in Vienna, Austria, July 6, 1832; executed July 19, 1867. He was the younger brother of Francis Joseph I. of Austria, received a liberal education in the German universities, and was given special training for the navy. In 1857 he was appointed governor of the Lombard-Venetian kingdom, the duties of which he administered with eminent success, but a civil war caused him to resign two years later. He married Princess Charlotte, daughter of Leopold I., King of Belgium. The complicated affairs of Mexico induced France to join a deputation of notable Mexicans in an attempt to secure peace. After due deliberation it was decided to offer the crown to Maximilian, who accepted it with some hesitation, and in June, 1864, landed at Vera Cruz to take charge of the Mexican government. The army and clergy extended a hearty welcome to the new monarch, but difficulties soon arose among the different parties. Besides, there were abuses that his supporters expected him to sanction.

MAXIMILIAN, EMPEROR OF MEXICO.

The advocates of independence organized a powerful army under Juarez to expel him, but Maximilian was supported by a military force sent to Mexico by Napoleon III. However, this army Napoleon was compelled to withdraw. It was the wish of the French people that Maximilian should accompany their troops and give up the territory, but he could not be induced to regard such a move otherwise than disgraceful. His accomplished wife made heroic but vain appeals for European forces to intervene, but after many disappointments and great grief her reason failed. Maximilian headed an army of 10,000 men at Querétaro, where he was besieged for several weeks by a republican army under Escobedo, and on May 15, 1867, made an attempt to pass the lines of the enemy, but was placed under arrest, having been betrayed previously by General Lopez. A trial followed, which resulted in his conviction of treason, filibustering, and usurpation of public power. The ministers of foreign countries protested in vain against the decree that he be executed, since it was not in accordance with civilized warfare. However, Maximilian had issued a proclamation in 1865 by which the punishment of death was announced to all persons who should offer resistance to the government, and on account of it the Mexicans refused to grant him mercy. Accordingly he and his two generals, Miramon and Mejia, were shot. His remains were conveyed to Vienna, where they were interred in the imperial vault.

MAXIMILIAN I., Emperor of Germany, son of Frederick III., born at Neustadt, near Vienna, Austria, March 22, 1459; died Jan. 12, 1519. He married Mary, heiress of Charles the Bold, in 1477, and through her secured Flanders and Burgundy. Soon after he became involved in war with Louis XI. of France, who was ambitious to possess Flanders. However, when his wife died, in 1482, he made peace by betrothing his daughter, Margaret, to the dauphin, afterward Charles VIII., and included as her dowry Flanders, Artois, and Burgundy. The Romans chose him king in 1486, and immediately after he began to organize an expedition to expel the Hungarians from the Austrian territories on the Danube, which he did in 1490, and two years later defeated the Turks at Villach. In 1493 he secured the provinces ceded to France in 1482, and, on the death of his father, in the same year, became emperor.

Maximilian now married Bianca Sforza, daughter of the Duke of Milan, by which union he was induced to make an effort to secure possession of a large part of Italy, especially Milan and Naples, but his resources were inadequate to cope with France. Accordingly, he surrendered his claim of Verona to the Venetians and that of Milan to France. The Swiss Confederation next attracted his attention, but, as a result of the Peace of Basel, in 1499, its territory became practically independent. However, he secured Tyrol at the death of his cousin, the Archduke Sigismund, and shortly after received a part of Bavaria, Gorz, and other possessions contiguous to them. The marriage of two of his grandchildren with children of the King of Hungary and Bohemia brought those two countries to Austria as hereditary possessions. Maximilian was one of the most celebrated of the Holy Roman emperors, established improved codes of civil laws, founded the universities of Vienna and Ingoldstadt, encouraged commerce and manufacture, and disseminated knowledge in industrial arts. Not only did he have a favorable inclination toward education, but he was himself a man of learning, physical skill, and humane

disposition. He is the author of several treatises on gardening, the chase, and military science.

MAXIMILIAN II., Emperor of Germany, son and successor of Ferdinand I. of Austria, born in Vienna, Austria, Aug. 1, 1527; died Oct. 12, 1576. He became King of Bohemia and the Romans in 1562, King of Hungary in 1563, and Emperor of Germany in 1564. A war was in progress between Turkey and Hungary at the time of his accession and a peace was concluded whereby the Sultan, Soliman II., should retain the conquered provinces in Hungary. He tolerated Protestantism, but many of his close advisers were ardent advocates of the Catholic faith, and his influence in the government became limited by Jesuit influences.

MAXIMS, Legal, the brief expressions of general principles, either of policy or justice. In many cases they have furnished special rules for the decision of disputes. They fulfill the same purpose for courts and lawyers that the ordinary proverbs subserve in common usage. The number includes about 2,000 legal maxims. They may be divided into those that have reference to the common rights and duties of individuals and those that embrace the fundamental principles in the science of government. Some have come down from the law of Rome, while others were formed in medieval and modern times among the jurists of Europe. A large number of these maxims are stated in Latin and they are classified in Broom's "Legal Maxims." The following is a brief list:

Once a fraud, always a fraud.
To conceal a fraud is itself a fraud.
Where there is a right there is a remedy.
Equity follows the law.
No one is bound to do what is impossible.
Ignorance of the law excuses no one.
He who acts by another, acts himself.
Let the buyer be on his guard.
First in time, first in right.
From nothing comes nothing.
Acts indicate the intention.

MAX-MÜLLER (măks-mül'lĕr), **Friedrich,** German philologist, born in Dessau, Germany, Dec. 6, 1823; died Oct. 28, 1900. He was a son of the poet Wilhelm Müller, received an education at Leipzig and Berlin, and in 1843 studied Sanskrit at Paris. His education included a liberal knowledge of Persian, Arabic, and comparative philology. The East India Company of England commissioned him in 1847 to edit the "Rig-Veda," a work issued from the press of the University of Oxford. He became professor of modern languages at Oxford in 1854, was made Oriental librarian of the Bodleian Library in 1856, and two years later became fellow of All Soul's College. Subsequently he held other important positions in the higher institutions of England. He was first president at the congress of Orientalists in Stockholm, Sweden, in 1889, and received many distinguished honors from learned societies and sovereigns of many leading countries. He is by common consent classed as the greatest linguist of the 19th century. His writings are among the most important of the latter part of that century, containing very valuable contributions in antiquities, philology, science, and Oriental history. Among his books most extensively read are "Chips from a German Workshop," "History of Sanskrit Literature," "Institutes of Vishu," "The Sacred Books of the East," "The Origin and Growth of Religion," "Psychological Religion," "The Science of Language," "Sacred Hymns of the Brahmans," and "Natural Religion and Physical Religion."

FRIEDRICH MAX-MÜLLER.

MAXWELL (măks'wĕl), **James Clerk,** author and philosopher, born in Edinburgh, Scotland, June 13, 1831; died Nov. 5, 1879. He studied at Edinburgh Academy and Cambridge. His writings include "Matter and Motion," "Theory of Heat," and "Electricity and Magnetism."

MAXWELL, Mrs. John, novelist, born in London, England, in 1837; died at Richmond, Feb. 4, 1915. Her maiden name was Mary Elizabeth Braddon. She took an interest in literature at an early age, became editor of the *Belgravia,* and in 1874 married John Maxwell. Her novels include "Aurora Floyd" and "Ishmael."

MAXWELL, William Henry, educator, born in Ireland, March 5, 1852. He studied at Queen's College, Galway, and emigrated to America in 1874. In 1882 he was made assistant superintendent of schools in Brooklyn, N. Y., where he became superintendent in 1887. His successful work of supervision gained for him a wide reputation, and in 1898 he was made city superintendent of Greater New York. He published several educational works, including a number of text-books on language and grammar, and edited an edition of Pope's complete works. He died May 3, 1920.

MAY, the fifth month of the year in the Gregorian calendar, consisting of 31 days, sometimes called the *month of flowers.* The Romans celebrated the festival of Floralia for several days, usually beginning on the 28th of April. A similar custom prevails in many countries of Europe, where the young folks gather flowers and branches with young foliage. These are used in adorning the windows and doors of the houses and the village Maypole, around which

they play youthful games. The most beautiful girl in the village is chosen as queen of May to preside over the festival in England. In Germany it is customary to choose a count of May. A similar celebration is held in some parts of the United States, known as May Day.

MAY, Phil, illustrator, born in Leeds, England, in 1864; died in 1903. He began to study architecture at the age of fifteen, but soon gave it up to join a strolling theatrical company. In the meantime he was employed to draw comic portraits for advertising purposes, which enabled him to develop his natural artistic ability. In 1884 he engaged on the *Sydney Bulletin,* Australia, and afterward sketched for a number of London periodicals, including the *Daily Graphic* and *Punch.* His skill in sketching from real life in a pleasing manner was due largely to his keen observation. He was particularly successful in sketching those who frequented the stage, the race course, and the slum districts. His sketches were collected and published under the titles "Phil May's Annual," "Phil May's Gutter-Snipes," and "Phil May's Sketch Book."

MAYA (mä'yä), the name of a group of Indians found in Mexico and Central America. They are short in stature and have a brown skin and a broad head. It is believed that they were quite highly advanced in civilized arts prior to the discovery of America, and at present they still practice many of the industries with considerable skill. They had large cities in Yucatan and other parts of Mexico at the time of the Spanish conquest, when they manufactured fabrics of cotton, made ornamental articles of metal, and constructed with brick and stone. They had domesticated bees for their honey and wax and made considerable advancement in cultivating beans, peppers, and corn. The Mayas had a calendar in which the year consisted of 365 days, divided into eighteen months of twenty days each, the year beginning on July 16th, when the sun crossed the zenith. They had a number of literary works, including several sacred books issued under the title of "Books of Chilan Balam." The government was by tribes and the lands were held in common by the villages. At the time of the Spanish conquest the peninsula of Yucatan was under one government, which consisted of a number of affiliated districts.

MAY APPLE, a perennial plant of North America, which is erroneously called mandrake in some localities. A slender stem about a foot high rises from a creeping rhizome, forking near the upper part into two petioles, each surmounted by a large leaf. At the point of division grows a solitary white flower with waxy petals, and this is followed by the May apple, a fleshy fruit about the size of a pigeon's egg. The fruit is slightly acid and has a pleasant flavor. It is eaten. The root, when dry, constitutes a useful drug, given in the form of a powder as a purgative.

MAYFLOWER, the name of the vessel in which the Pilgrim Fathers sailed from Southampton, England, to North America in 1620. It had a capacity of 180 tons. The *Speedwell* sailed from Delft Haven and joined the *Mayflower,* but returned to Holland shortly after leaving England. On Dec. 21, 1620, the *Mayflower* landed on the shores of Massachusetts. The Pilgrim Fathers, before landing, bound themselves to obey the laws they should make. This instrument is known as the Mayflower Compact.

MAYNARD (mā'nērd), a village of Massachusetts, in Middlesex County, on the Assabet River, ten miles northeast of Marlboro. It is on the Boston and Maine Railroad. Electric lighting, waterworks, sewerage, and several fine schools are among the public institutions. The manufactures include powder, machinery, and woolen goods. Population, 1925, 7,857.

MAYNOOTH (mâ-nōōth'), a village of Ireland, in Kildare County, fifteen miles west of Dublin. Anciently it was the chief seat of the Geraldines, which is attested by the ruins of a castle. Now it is known principally by the Roman Catholic College of Saint Patrick, an institution established in 1795 by the Irish Parliament for the education of priests. It was supported by government grants until 1869. Improvements were made in 1890 by expending $250,000. The institution has well-planned courses of study and is attended by about 600 students.

MAYOR (mā'ẽr), the chief executive officer in an incorporated village, town, or city. The duties are prescribed by statutory law or by municipal ordinance, hence they differ materially in the different states or nations where the office is recognized. In the larger cities of Great Britain, such as York and London, the chief executive has the title of *lord mayor.* The mayor is appointed by the central government in some countries, such as Sweden and Italy, but in most of the municipalities of the United States and Great Britain the election is by the people for a term of years. In Germany this officer is known as *burgomaster,* or *bürgemeister.*

MAYOTTE, or **Mayotta** (mä-yŏt'tä), one of the Comoro Islands, located in the Indian Ocean, near the entrance to Mozambique Channel. The area is 135 square miles. It was ceded to France in 1842. Population, 1922, 11,675.

MAYSVILLE, a city in Kentucky, county seat of Mason County, on the Ohio River, sixty miles northeast of Lexington. It is on the Louisville and Nashville and the Chesapeake and Ohio railroads. Among the chief buildings are the county courthouse, the Masonic Temple, the public library, and the Odd Fellows' Hall. The manufactures embrace furniture, cotton goods, pulleys, tools, flour, tobacco, and lumber products. It has a growing trade in

farm produce and merchandise. Maysville was settled in 1784 and was incorporated in 1787. It became the county seat in 1848. Population, 1900, 6,423; in 1920, 6,107.

MAYWEED, a disagreeably strong-scented weed of the aster family, sometimes called dog-fennel, stinking chamomile, and dill weed. It is an annual plant, has finely dissected leaves, composite flowers with a yellow disc and a white rim, and grows particularly along roadsides, paths trodden by cattle, and in pastures. The plant is a native of Europe, but has been naturalized throughout the older settlements of Canada and the United States. It is easily exterminated by cultivation, but, if left undisturbed, it spreads rapidly.

MAZARIN (mä-zȧ-răn′), **Jules,** cardinal and statesman, born at Piscina, Italy, July 14, 1602; died in Vincennes, France, March 9, 1661. He was taken to Rome at an early age for a course of training under the Jesuits, and in his seventeenth year pursued advanced studies at Alcalá, Spain. In 1624 he became captain of infantry in the Pope's army, and in 1629 was intrusted by Pope Urban VIII. with the management of the war of the Mantuan succession. Shortly after he accompanied a legate sent by the Pope to the court of France, where he met Richelieu, by whom he was offered an important position under the King of France, which he accepted, and in 1639 became a naturalized Frenchman. In 1641 he was rewarded for his influence in winning over the Princess of France to the king by being promoted to the rank of cardinal. When Richelieu died the following year, Mazarin succeeded him as supreme minister. In that position he showed himself a man of marked natural ability and acquired skill in discharging the duties of that office.

Mazarin had an inherited desire to humiliate the house of Austria, for which purpose he formed alliances with Sweden and the Netherlands, and likewise operated to establish the French frontier at the Rhine. Thinking that a Spanish princess would unite the Spanish Netherlands as a dowry to Louis XIV., he became implicated in a policy which aroused opposition in the United Provinces and the terms of the Treaty of Westphalia, in 1648, did not strengthen him. Soon after the civil war of the Fronde arose, during which his policy, like that of Richelieu, was to weaken the nobles and limit feudal ownership of land. This course against the nobility and excessive taxation necessitated his exile for a number of years, but in 1653 he was permitted to return to Paris, where he was reinstated in his former position with much enthusiasm. Decisive policies as to internal organization and foreign commerce brought him back to his former popularity, and France became more powerful both at home and abroad. Among the advantages attained may be enumerated an alliance with Cromwell and the marriage of Louis XIV. with the Infanta Maria Theresa, a union by which France secured claims to succession in Spain. He left a vast fortune at his death. In 1745 his "Letters" were published in Paris.

MAZATLÁN (mä-sȧt-län′), a city and seaport of Mexico, in the state of Sinaloa, near the entrance to the Gulf of California. It is finely located on a small peninsula, opposite the Bay of Olas Altas, and has a large trade in pearls, dyestuffs, minerals, and earthenware. The harbor is one of the most important in Mexico. In 1903 it was afflicted with an attack of the bubonic plague, but ordinarily it is healthful. Population, 16,430.

MAZEPPA (mȧ-zĕp′pȧ), **Ivan Stephanovitch,** Polish military officer, born in Podolia, Poland, in 1645; died Sept. 22, 1709. He descended from a noble family and became page for the Polish king, John Casimir. While a youth he was implicated in a family matter and as punishment was bound to the back of an untamed horse. The animal passed through the native woods until at last it reached its former haunts, but was captured by peasants, who released him. Subsequently he joined the Cossacks, who selected him as their chief because of his courage and bravery. Peter the Great was attracted by Mazeppa's skill and created him Prince of Ukraine. In this official position he became touched by the hardships imposed upon the Cossacks and, as a means of securing reforms, he concluded a conspiracy with the King of Sweden, Charles XII. When his treason became known to Peter the Great, Mazeppa joined Charles XII. and rendered assistance in the Battle of Pultowa. His army being defeated, he was compelled to flee with Charles XII. to Bender, Turkey, in 1709, and died the same year. Lord Byron made Mazeppa the hero of one of his best known poems.

MAZZINI (mȧt-sē′nē), **Giuseppe,** revolutionist, born in Genoa, Italy, June 28, 1805; died in Pisa, March 10, 1872. He descended from a family in good standing, entered the University of Genoa in 1818, and in 1826 graduated from the law department. About that time he became interested in literature and contributed to various journals, besides writing a number of essays, among them "Dante's Love of Country." The government suppressed several of the political papers to which he contributed, owing to his liberality. In 1830 he joined the secret society of the Carbonari, an organization to spread the doctrines of independence. It was soon after succeeded by the more liberal league known as Young Italy. He was imprisoned for a year because of being an active member, but after his release became the more active, on account of which he was exiled to Marseilles in 1832. Shortly after the French government ordered him from the country, when he settled in Switzerland, and there planned a number of revolutionary movements, but was expelled from the Swiss Confederation in 1837, when he proceeded

to London. His activity was ceaseless and well directed. Several concerted organizations were formed in various countries, even though he had to support himself by conducting night schools, but in 1844 the English authorities interfered with his mail by sending a number of letters to Italian officials.

Mazzini was an active participant in the Revolution of 1848. He operated at first in Lombardy, then proceeded to Tuscany, operating everywhere in full accord with Garibaldi and, when the Pope was compelled to flee, in 1849, he became president of the new republic, on March 29 of that year. The army of France appeared before Rome on April 25 and, after a heroic defense, Mazzini was compelled to surrender. In 1860 he coöperated with Garibaldi in the successful Sicilian expedition and in 1864 returned to England, where he continued his active support of the Garibaldi party by writing and publishing pamphlets. In 1868 he became dangerously ill, but recovered sufficiently to take an active part in a republican rising in Italy. He was arrested at Gaeta and kept a prisoner at Rome until liberated by the Italian army. Mazzini was a man of extraordinary eloquence and influence, personally frugal and unselfish, and a powerful force in making it possible to finally overcome the power of the Pope in governing both the church and the state, as well as furthering the cause of popular government. Both Garibaldi and Cavour were successful chiefly because of the work commenced by Mazzini.

MEAD, Larkin Goldsmith, sculptor, born in Chesterfield, N. H., Jan. 3, 1835. He settled at Brattleboro, Vt., when quite young, securing his education in that city. Later he studied art in Brooklyn, N. Y., and in Italy, where his natural ability was shaped into artistic skill. His productions embrace "The Recording Angel," a statue entitled "Vermont," now over the dome of the Montpelier capitol, "Columbus Before Isabella," and "The Returned Soldier." In 1862 he prepared a model for a statue of Lincoln and from it made the beautiful sculpture now at the Lincoln monument, Springfield, Ill. "The Father of Waters" is the name of his famous sculpture at Minneapolis, Minn. His productions include various groups and figures prepared especially for different states. He died Oct. 15, 1910.

MEADE, George Gordon, general, born in Cadiz, Spain, Dec. 30, 1815; died in Philadelphia, Pa., Nov. 6, 1872. His birth occurred at the time his father was naval agent for the United States in Spain. He graduated with honors at West Point in 1835, took part in the campaigns against the Seminole Indians, and soon after became civil engineer. In 1842 he again entered the army. He served with distinction on the staffs of Taylor and Scott in the Mexican War, attaining particular successes at Palo Alto and Monterey. After the Mexican War he engaged as constructor of lighthouses and surveyor of the Great Lakes, and at the beginning of the Civil War became commander of a Pennsylvania brigade of volunteers. He commanded in the Seven Days' battles, was severely wounded at Glendale, and distinguished himself in the Antietam campaign and the Battle of Fredericksburg. At Chancellorsville he had command of a corps and at the resignation of Hooker succeeded to the command of the army of the Potomac. Almost immediately after occurred the Battle of Gettysburg, on July 1-3, 1863, and for skill and valor demonstrated he received the thanks of Congress.

GEORGE G. MEADE.

Meade remained in command of the army of the Potomac throughout the year 1864 and General Grant assumed general command, the two warriors remaining close friends during the entire contest. In May of that year occurred the Battle of the Wilderness and the event of the war closed with Lee's surrender. During the entire time Meade commanded with such efficiency that in August he was promoted to the rank of major general. He was made commander of the military division of the Atlantic in 1865, the following year he became commander of the department of the east, and subsequently of the military district including Alabama, Florida, and Georgia. Citizens grateful for his services to the country subscribed a handsome fund with which they purchased a beautiful home for him in Philadelphia, where his death occurred.

MEADOW LARK, a bird of North America, ranging from the central part of Canada to the Mexican boundary. It belongs to the oriole family, migrates northward in the spring, and is valuable as a destroyer of insects. The song is sweet and plaintive, the feathers are brownish with reddish at the end, and across the breast is a black crescent-shaped collar. In some localities it is hunted for food. The common species is ten inches long, the bill has a length of nearly two inches, and the extended wings measure fifteen inches. It is allied to the starlings. See **Lark.** See illustration on following page.

MEADVILLE, a city in Pennsylvania, county seat of Crawford County, on French Creek, 104 miles north of Pittsburg. It is on the Erie Railroad and the Bessemer and Lake Erie Railroad. The surrounding country is agricultural and dairying and contains deposits of natural gas, oil, and coal. Among the noteworthy buildings are the county courthouse, the public

library, the Meadville Commercial College, the Allegheny College, the First Methodist Episcopal Church, and many business blocks. The manufactures include lumber products, flour, machinery, hardware, leather belting, and utensils. The municipal facilities include pavements,

MEADOW LARK.

electric lights, waterworks, and street railways. The place was settled in 1788 and incorporated in 1823. Population, 1920, 14,568.

MEASLES (mē'zl'z), an eruptive and infectious disease. It is most prevalent among children and seldom occurs more than once in the same individual. The rash appears about eight days after exposure and is accompanied by sneezing, watery eyes, watery discharge from the nose, and frequently by pain in the forehead. The greatest danger occurs from an affection of the bronchi and a relapse following exposure to cold at the time of affection or immediately after. Crescent-shaped spots of red appear on the skin, occurring first on the face and later passing downward, and disappear in the same order. Measles occurs most frequently in the colder seasons of the year. It rarely affects children under the age of five months and is not particularly dangerous in the young, unless they are exposed to cold or a severe draught of cold air. In old age it is much more dangerous and deaths from it are not infrequent. A form of disease known as *rötheln,* or *German measles,* is often mistaken for scarlatina and measles, but differs from them. The eruptions in rötheln last longer, usually from four to ten days. It is a very mild disease, requiring only liquid food, laxative treatment, and keeping in bed a number of days.

MEASURE (mĕzh'ûr), the extent, volume, quantity, capacity, or dimensions of anything as ascertained by a certain rule or standard. Standards of measurements are fixed by law or custom. They are recognized by all the civilized countries, but differ materially in the various governments. Below are the principal measurements used in Canada and the United States for determining extent and volume.

LINEAL MEASURE.

12 inches	make	1 foot
3 feet	"	1 yard
5½ yards, or 16½ feet	"	1 rod
4 rods	"	1 chain
10 chains, or 40 rods	"	1 furlong
8 furlongs, 5,280 feet	"	1 mile

SQUARE MEASURE.

144 square inches	make	1 square foot
9 square feet	"	1 square yard
30¼ square yards	"	1 square rod
16 square rods	"	1 square chain
10 square chains	"	1 acre
640 acres	"	1 square mile

SURVEYOR'S MEASURE.

7.92 inches	make	1 link
100 links, or 22 yards	"	1 chain
80 chains	"	1 statute mile
69.121 miles	"	1 geographical degree

CUBIC MEASURE.

1,728 cubic inches	make	1 cubic foot
27 cubic feet	"	1 cubic yard
231 cubic inches	"	1 standard gallon
2,150.42 cubic inches	"	1 standard bushel
50 cubic feet round timber	"	1 ton
40 cubic feet hewn timber	"	1 ton
16 cubic feet	"	1 cord foot
24¾ cubic feet	"	1 perch of stone
8 cord feet, or 128 cubic feet	"	1 cord of wood
36 bushels, or 57¼ cubic feet	"	1 chaldron

CLOTH MEASURE.

2¼ inches	make	1 nail
4 nails	"	1 quarter
4 quarters	"	1 yard
3 quarters	"	1 ell Flemish
5 quarters	"	1 ell English
6 quarters	"	1 ell French

MEASURING WORM, the name applied to small caterpillars of an extensive group of moths. They are sometimes called *loopers,* owing to the peculiar manner in which they move from place to place. The body is long and slender and the feet are at the extreme ends of the body. In moving they fasten the fore feet and bring the hind feet forward, the body forming a large loop. They vary greatly in color and size. Many species resemble the leaves and twigs of trees frequented by them. Some are injurious to plants, such as the *currant worm,* which is very destructive to currant bushes and other plants. The *cotton caterpillar,* though not a true measuring worm, has the looping or measuring movement when walking.

MEAT PACKING, the industry of slaughtering animals and preparing various kinds of meats and other commercial products from their carcasses. The larger part of live stock raised for the market is purchased by local dealers and shipped by railways to the large meat-packing centers, such as Chicago, Kansas City, South Omaha, Montreal, Cincinnati, and New York. Those engaged in stock raising usually deliver the animals to the local dealer, who loads them in specially constructed stock cars, and trains made up of such cars are usually run at higher speed than ordinary freight trains. The animals are unloaded and placed in stock yards as soon as possible after they reach the destination, where they are sold through commission merchants to the packing houses. Hogs and sheep

are slaughtered soon after being unloaded, but cattle are allowed to rest about a day.

The slaughterhouses are constructed on plans that make it very convenient to handle the animals, both before and after slaughtering. Inclined viaducts permit driving the animals to the top of the building, where they are killed, and the carcasses are handled downward by a series of workmen. Swine are hooked by the nose to an endless chain and passed through scalding vats, and then are carried through an automatically adjusted scraper, by which they are deprived of hair and bristles in a few seconds. The next step is to hoist them head downward upon an inclined rail, when they are disemboweled, beheaded, washed, and trimmed at a rapid rate, usually about twenty a minute. The cattle and sheep are handled in a similar way, but are skinned instead of being scalded. It requires about eight minutes to slaughter and dress a sheep, while a steer is passed through the process in forty minutes. All of the labor is carefully classified, each workman having a particular part in the work of caring for the animals.

After being dressed, the animal is placed in the cooling room, in which the temperature is a little above the freezing point. It requires about three days to remove all the animal heat from pork and make it ready for use, or for the processes by which it is prepared for the market. Both beef and pork are packed in refrigerator cars, after cooling, especially if the shipment is to be made for some distance. However, beef that is intended for local consumption is usually kept in cold storage a little longer, frequently eight or ten days. This permits the product to "ripen," meaning that it is both cooled and rendered tender as a result of being in cold storage. The use of refrigerator cars and refrigerator ships permits the transportation of meats without danger of loss, and these otherwise perishable products are delivered in a first-class condition at Liverpool, Hamburg, and Havre.

Meat packing as at present managed is concerned in placing many products upon the market aside from fresh beef, mutton, and pork. Not more than ten per cent. of the whole hog is sold as fresh meat, the remainder being pickled in brine and smoked, thus forming bacon or ham. The trimmings are used largely in the manufacture of sausage, which constitutes a profitable part of the packing industry. Other products include salt meats, dried beef, lard, tallow, and canned meats. The carcass of a swine is usually cut to suit the custom of the country where it is to be marketed, but usually into sides, shoulders, hams, loins, and spare ribs. Two kinds of lard are made, known as *leaf lard* and *steam lard*. The better class of trimmings and the pure leaf are used in making leaf lard, while the smaller trimmings from the legs and head bones and the smaller scraps make the steam lard. The poorer cuts and the less valuable grades of cattle furnish the meat for canning.

The meat-packing industry has been systematized so all parts of the animal are used. Leather is made of the hides; sausage casing, of the intestines; fertilizers, of the blood and offal; buttons and knife handles, of the hoofs; and various manufactures, of the wool of sheep and of the bristles of hogs. Soap, glue, and oils are derived from the hoofs. The bones are used in making filters and fertilizers.

In the production of meats of all kinds the first rank is held by the United States, where the dressing, packing, and shipping of meat are consolidated in a number of immense establishments. This is not the case in Europe, where many slaughterhouses are erected and maintained at public expense. Practically all the slaughtering in Germany and a large proportion of it in England is done at municipal abattoirs, but in Canada and the United States a large part of the fresh meat, especially in the smaller towns and cities, is placed on the markets by the slaughterhouses located within the community. Small establishments usually lack systematic inspection, but the larger packing houses are under careful supervision of the government. In such cases the animals are examined by inspectors before being slaughtered, and the meat is likewise inspected with a view of detecting some diseases that cannot be discovered while the animal is on the hoof. In the United States the inspection has been at government expense since 1906. In that country the annual slaughter of cattle is 12,750,000; sheep, 10,125,000; and swine, 35,850,000. About two-fifths of the slaughtering is done in Chicago.

MECCA (měk'kà), or **Mekka**, an ancient city of Arabia, capital of the province of Hedjaz, noted as the birthplace of Mohammed. It is located in a valley about 65 miles east of Jiddah, its seaport on the Red Sea, and is surrounded by hills and sandy plains. The adjacent hills form a natural protection and make it impossible to see the city until the traveler is near its confines. Stone and brick enter largely into the architecture, the buildings are mostly from three to four stories high, and the newer structures have windows that open toward the streets. Very little paving has been done, thus leaving the streets dusty in summer and muddy during the rainy season. The only drainage provided is on the surface, though it has several streets that are regular in construction and contain handsome buildings ornamented with paintings. Provisions of all kinds are carried to the city by camels and vehicles, this being necessitated by the barren character of the surrounding country. The size of the city is to be attributed wholly to its being the birthplace of Mohammed, by virtue of which it is the holiest city of the Moslem world, and to it are attracted vast numbers of pilgrims from all parts of the Mohammedan countries.

El-Haram, or the house of God, is situated in the center of the city, in which the Kaaba is kept and which has been a center of attraction for ages. The Kaaba contains a small meteoric stone, which is securely built into the southeast corner and forms the Black Stone or fetich. Nineteen gates admit pilgrims into the El-Haram. It has room for 35,000 persons. Once within its confines, the pilgrims do not leave until they kiss the Black Stone. Another attraction is the so-called Southern Stone, which has a traditional power when touched, while an inclosure within the building is supposed to contain the remains of Hagar and Ishmael. The interior is decorated elaborately with precious stones, silver and gold, and fine drapery, and the wealthy Moslems journey there annually. Those who are unable to make the journey may send a substitute, defraying his expenses, but at the same time receiving the benefits. *Hadji,* or Hajj, is the term applied to those who make the pilgrimage.

Mecca has few noteworthy buildings aside from the El-Haram. The city is destitute of trees and has no verdure of any kind. Among the manufactures are textiles, clothing, jewelry, medicine, and embroidery. It is governed by a sherif under the Sultan of the Turkish Empire and entertains annually from 75,000 to 100,000 pilgrims. Mohammed conquered the city in 627, but in 930 it was sacked by the Karmathians, who carried the Black Stone with them and retained it for nearly a quarter of a century. In 1833 Mecca became a possession of the Pasha of Egypt, but was soon after made a part of Turkey. Population, 1922, 61,550.

MECHANICAL POWERS, the instruments or means by which heavy weights may be sustained, or material resistance overcome, by a small force. The important mechanical powers, one or more of which are necessary in the construction of machinery, include the wedge, screw, inclined plane, lever, pulley, and wheel and axle.

MECHANICS (mĕ-kăn'ĭks), the branch of physical science that treats of the phenomena caused by the action of forces on material bodies. That branch of mechanics which investigates the effects of forces not in equilibrium, but producing motion, is termed *dynamics.* The division that investigates the relation between forces in equilibrium is called *statics. Pneumatics* is the special branch of hydromechanics that treats of gases.

MECHANICSVILLE (mĕ-kăn'ĭks-vĭl), a city of New York, in Saratoga County, 18 miles north of Albany. It is on the Hudson River, the Champlain Canal, and the Boston and Maine and the Delaware and Hudson railroads. Waterworks, a public library, and several fine schools are among the noteworthy institutions. The manufactures include paper, lumber products, and clothing. Population, 1925, 8,514.

MECHANICSVILLE, Battle of, an engagement of the Civil War, fought at Mechanicsville, Va., on June 26, 1862. General McClellan attempted to approach Richmond and stationed General Porter with 5,000 Federal troops at Mechanicsville, about seven miles north of Richmond, where he was attacked by General Lee with a force of 10,000 Confederates. The Federals repulsed two attacks, but reinforcements arrived under the command of General Stonewall Jackson on the following day, when General Porter retreated to Gaines's Mill. In the engagement the Federals lost 360 and the Confederates lost 2,000 men. This battle is sometimes called the Battle of Beaver Dam Creek. It was the first engagement of the Seven Days' Battles of the Peninsular Campaign.

MECHLIN (mĕk'lĭn), or **Malines,** a city of Belgium, on the Dyle River, in the province of Antwerp, twelve miles northwest of Brussels. The city is well built, graded, and paved. It has fine avenues of trees, extensive gardens, and regularly platted streets, and is proverbial on account of its cleanliness and beauty. The manufactures include machinery, woolen fabrics, hats, laces, and various textiles. It has a large trade and communication by railroads and electric railway lines. Among the noteworthy buildings are the Cathedral of Saint Rombaud, the Church of Saint John, the townhall, the public library, and several colleges of industry, art, and science. Many statues adorn the public places. Mechlin dates from an early period and in the 14th century ranked as one of the leading manufacturing centers of Europe. Population, 1922, 58,803.

MECKLENBURG DECLARATION (mĕk'lĕn-bûrg), a solemn compact made on May 20, 1775, by a convention at Mecklenburg, N. C., in which the people declared their independence of Great Britain. The declaration did not become generally known until 1818 and the original documents were destroyed by fire several years earlier, in 1800. May 20 is a legal holiday in the State of North Carolina because of that day being the anniversary of the Mecklenburg Declaration.

MEDAL, a piece of metal cast in the form of a coin, and stamped with some figure or inscription to commemorate some illustrious person, or some remarkable deed. Medals are usually issued as a reward of merit, and differ from coin in that they are not current as money.

MEDEA (mē-dē'ȧ), in mythology, a daughter of Aeetes, King of Colchis, and the niece of Circe. She was famous for her skill in sorcery. It was through her instrumentality that Jason, with whom she had fallen in love, was enabled to possess himself of the Golden Fleece. After obtaining this prize, she fled with Jason to Greece, where she lived with him as his wife. At length she was deserted by her husband, who was fascinated by Creusa, the daughter of Creon, King of Corinth. In the fury of revenge she sent her rival a poisoned garment, which

caused her death, and afterward she fled to Athens in a chariot drawn by a winged dragon. Afterward she was detected in laying snares for the destruction of Thesus, when she withdrew from Attica into Asia, where her son Medus became the founder of the Median nation.

MEDELLÍN (mā-thāl-yēn'), a city of Colombia, capital of the department of Antioquia, 40 miles southeast of Antioquia. It is situated on a high tableland and is surrounded by a farming and mining country. The chief buildings include a museum, a high school, and a public library. Chemicals, hardware, clothing, and machinery are among the manufactures. It has electric lights, waterworks, and railway connections with several inland cities. Population, 1922, 60,602.

MEDFORD (mĕd'fẽrd), a city of Massachusetts, in Middlesex County, on the Mystic River, five miles north of Boston. It is on the Boston and Maine Railroad and has communication by several interurban electric railways. The site has an area of nine square miles. Among the chief buildings are the public library, the city hall, the Tufts College, and the Cradock House, built in 1634. Brooks Playstead, Mystic Valley Parkway, and Middlesex Fells Park are fine public grounds. The manufactures include cotton and woolen goods, paper, machinery, truck bodies, automobile accessories, tools, clothing, novelties, and cigars. It has systems of pavements, waterworks, and sanitary sewerage. Medford was settled in 1630 and incorporated in 1892. Population, 1925, 47,627.

MEDIA (mē'dĭ-à), an ancient and powerful country of Asia, corresponding to the northwestern portion of Persia. Its boundary on the north was formed by the Caspian Sea, south by Persia, east by Parthia, and west by Assyria. The southern portion of that region is fertile and the northern part is mountainous. The inhabitants were called Medes. They were of the Aryan race and in language, religion, and manners were closely allied to the Persians. The Medes were not only skilled horsemen, but excelled in warfare and many of the arts of peace, especially in stock raising and agriculture. Assyria maintained some degree of sovereignty over them until 708 B. C., when they united and established their seat of government at Ecbatana and chose Kai Kobad as their chief. Shortly after they formed an alliance with Nabopolassar, King of Assyria, and overthrew the Assyrian Empire in 604 B. C.

In the 5th century the Medes conquered Scythia, much of Asia Minor, and parts of Egypt, but in 585 B. C. they were frightened into peace by an eclipse predicted by Thales. Their king Astyages was deposed in 560 by Cyrus of Persia, and from that time they are known in history as the Medes and Persians, but Cyrus styled himself King of Persia and emphasized his national descent. Cyrus took the treasures from Ecbatana to his own capital, but made it his summer residence, a custom followed by other Persian kings for many years. From the death of Alexander the Great, in 324, until the time of Augustus, Media constituted a separate kingdom, but a portion of it known as Great Media formed a part of the Syrian monarchy. Mithridates I. conquered Great Media and attached it to Parthia in 147 B. C. In the year 36 B. C. it was at war with Mark Antony. In the time of the Sassanain dynasty the whole of Media became a part of Persia, to which it has since belonged.

MEDICAL SCHOOLS, the institutions maintained to promote the professional training of physicians and surgeons. In ancient times comparatively little was done to further education in medicine, and dissection of the human body was practiced only at rare intervals prior to the 12th century. At that time laws were not enacted to regulate the practice of the healing art, hence numerous quacks and charlatans pretended to effect cures by methods and with drugs that have comparatively little healing value. One of the most famous medical schools of the Middle Ages was located at Salerano, Italy, and it exercised a wide influence by sending its graduates to many parts of Europe and Asia. The University of Paris, founded in 1205, is a pioneer in the education of surgeons and physicians. Medical departments were established at an early date in the universities, such as are still maintained in the German institutions at Erfurt, Vienna, and Wittenberg.

Medical departments in colleges and universities are very common in England and the United States, though many of the medical schools are distinctly professional, teaching both surgery and the practice of medicine as distinct and exclusive branches. Chairs for the teaching of medicine have been maintained at the universities at Oxford and Cambridge since the time of Henry VIII. The first medical school in the United States was founded in 1765, when the medical department of the College of Philadelphia was established, which afterward became the University of Pennsylvania. Other institutions having well-organized medical departments include Columbia University, New York; Harvard University, Cambridge; Yale University, New Haven; University of Chicago, Chicago; and a large number of others. The total number of these institutions is about 100. Canada has a large number of institutions at which medicine and surgery are taught, including the University of Toronto, Toronto; McGill University, Montreal; and Laval University, Quebec.

Admission to medical schools was formerly based upon a very low standard, but the requirements have been raised to a higher plane. At present it is required that those entering a medical school of recognized standing have certain literary attainments, such as graduation from recognized collegiate courses. The practice of medicine is protected by certain legal

restrictions. Most states and provinces maintain examining boards for the examination of those who wish to enter the medical practice. Practically all of the departments and institutions devoted to the study of medicine are open to the admission of women, and some institutions of this kind are maintained for the instruction of women who desire to become surgeons or physicians. In 1850 the Woman's Medical College was founded at Philadelphia. Elizabeth Blackwell opened the Woman's Medical College of the New York Infirmatory in 1868. Women are now engaged in the practice of medicine to a considerable extent, and one or more woman practitioners are located in nearly all of the cities and towns.

MEDICI (mĕd'ê-chē), a famous family in the history of the Florentine Republic, the founders of which owed their early distinction to successful and energetic commercial enterprises. Their influence became noteworthy as early as the 13th century, from which time they took a prominent part in the leading events of the republic. Their greatest influence dates from 1378, when Giovanni de' Medici rose to a position of influence and at his death, in 1429, left immense wealth and honors to his sons, Cosmo and Lorenzo. In the 15th century the Medici family rose to the dignity of sovereigns. They likewise exercised a marked influence upon the classical learning, commercial enterprises, and civil institutions of Florence and other European countries until in 1743, when the last of the Medici family, Electress Palatine of Tuscany, died.

MEDICI, Lorenzo de', sovereign of Florence, born Jan. 1, 1448; died April 8, 1492. He was the son of Pietro Medici, brother of Giuliano Medici, and received a careful and liberal education. At the death of his father, known as Pietro I., Lorenzo and Giuliano became joint rulers. Their reign aroused opposition among the Florentines, who began, in 1778, to plot their overthrow, being encouraged in this by Pope Sixtus IV. While the two were attending high mass at Florence, on April 26, 1478, conspirators fell upon them, in which Giuliano was killed, but Lorenzo succeeded in escaping after a heroic defense against his assailants. Immediately Lorenzo became the sovereign, punished his enemies, and established his government under a rigid system that gained the friendship of Innocent VII., successor to Sixtus IV. Having won the support of the Pope, he immediately began to encourage art and literature, founded the University of Pisa, introduced printing at Florence, and greatly enlarged the usefulness of the library founded by his grandfather, Cosmo. His government was directed rather to increase the power of the Medici family than to strengthen Florence against foreign opposition. This policy divided the people into several parties that finally made Florence an easier prey to ambitious warriors. Lorenzo was not only a prose writer, but a poet of considerable genius.

MEDICINE (mĕd'ĭ-sĭn), the science which is concerned in the cause, prevention, and cure of diseases. Medicine as a science investigates the structure and functions of the organs of the body, their liability to disease, how disease may be prevented, and the various remedial agents or antidotes that are to be prescribed for the alleviation or removal of disease. In early times diseases were attributed to supernatural forces. Then it was alleged that invisible beings would under certain circumstances affect the body and ultimately destroy it by death. Priests at first had charge of the medical and sanitary practice. Even at the present time there are superstitious views held by some of the people of Asia and other parts of the earth. For instance, it is not uncommon to pay from ten to twenty cents for a string to be worn about the neck by children as a preventive against disease, the price depending upon the length of time for which its virtues are guaranteed.

The skill possessed by the Egyptians in embalming their dead is taken as evidence that they knew and taught much in regard to the elements of anatomy. Aesculapius, a famous Grecian, who lived before the Trojan War, was one of the most eminent of early physicians and at his death became deified as the Greek god of medicine. Hippocrates, who lived about 1,000 years later, is known as the founder of Greek medicine. The science of medicine has been considered of importance from remote times by all classes, many savages possessing knowledge of the medicinal virtues of various barks, herbs, and plants, as well as different mineral substances. In modern times medicine has been considered one of the most important of sciences. It has had growing attention since the discovery of the circulation of the blood by Harvey, in 1616.

Many distinguished writers have classified medicines under three divisions: *Internal remedies,* such as are administered for their effect upon the system, both before and after absorption into the blood; *external remedies,* designed to act locally and not intended to affect the general constitution; and *chemical agents,* used for other than their medical properties. To administer the different remedies it is necessary to have a liberal knowledge of physiology, anatomy, hygiene, pathology, chemistry, and various allied subjects. The departments of medicine now commonly recognized include *surgery,* which relates to injuries and ailments visibly affecting the body; *medicine* proper, that department which belongs to the physician and embraces the care and administration of medicine in various forms of diseases; and *midwifery,* or *obstetrics,* the branch embracing diseases peculiar to women, childbearing, and ailments of very young infants. Besides these are special fields for study, such as pertain to *dentistry,*

dietetics, diseases of the eye and ear, and those giving particular attention to special diseases.

Hygiene is the science of health; *pathology,* the science of disease; and *nosology,* the science which investigates the origin and symptoms of various diseases and aims at their proper classification. *Therapeutics* includes the treatment of general and special diseases, together with their character and the effects of remedial agents on the human organization, both in health and disease. *Pharmacy* involves a knowledge of the preservation of drugs and mixtures of medicines; *materia medica* embraces the whole science of medicine; and *clinics* is the teaching of medicine and surgery by examining and treating patients in the presence of students. The science dealing with the care of women during pregnancy and for a short time after childbirth is termed *obstetrics.* The mechanical alterations of structure, such as are employed in cases of deformity or abnormal conditions, are treated in the science known as *pathological anatomy.*

Many associations are maintained to promote professional fellowship, compare theories and modes of medical practice, and study measures by which the science of medicine may be improved and elevated. A majority of these organizations belong to the *allopathic* school, but there are large associations of the *homoeopathic, eclectic, osteopathic,* and other schools of medicine and treatment. The first society organized in America is the New Jersey State Medical Association, in 1766, and the chief national organization is the American Medical Association, organized in New York in 1846. At present the number of medical colleges in America is very large. They have an annual attendance of about 18,500 students. Those who graduate each year aggregate fully one-sixth of the number enrolled. These colleges are largely public enterprises, and are quite generally supported by public grants. Nearly all are open alike to both sexes, while a few are exclusively for women. Admission to practice medicine is regulated by law. The tendency is to elevate the practice by requiring a continuous improvement of the courses of instruction and thorough preparation before admitting applicants to the profession.

MEDICINE HAT, a town of Canada, in the southeastern part of Alberta, about 300 miles southeast of Calgary. It is on the South Fork of the Saskatchewan River, on the Canadian Pacific Railway, and is surrounded by a fertile and grazing country. The climate is healthful. It has a considerable trade in merchandise, grain, and live stock. The manufactures include flour, stoneware, candy, machinery, and clay products. Natural gas is obtained in the surrounding country, furnishing cheap fuel for industrial purposes. It has several fine schools and churches. Population, 1921, 9,634.

MEDILL (mĕ-dĭl′), **Joseph,** journalist, born in New Brunswick, Canada, April 6, 1823; died in San Antonio, Tex., March 16, 1899. In 1849 he founded a Free Soil newspaper at Coshocton, Ohio, and two years later established the Cleveland *Forest City.* Subsequently he secured an interest in the Chicago *Tribune,* of which he became chief editor, advocating antislavery doctrine. He supported the Republican party and its nominees for President, was appointed a civil service commissioner by President Grant in 1871, and was elected mayor of Chicago in 1872. Two years later he became editor and principal owner of the Chicago *Tribune,* which he published until his death.

MEDINA (mā-dē′nà), a city of Arabia, about 250 miles north of Mecca, regarded by the Moslem world as next holy to Mecca. The city is accorded this distinction for the reason that it was Mohammed's home while exiled from Mecca. It is fortified by a wall from thirty to forty feet high, having thirty towers, and has a strong Turkish garrison. The surrounding country is one of the most fertile regions of Hejaz and is devoted to agriculture and stock raising. A mosque is located on the place where it is thought that Mohammed died, in which visitors are shown the tomb of the prophet within a screen of iron filigree. The coffin is reputed one of much value, being cased with silver and ornamented with precious gems, and in it the body of Mohammed is believed to lie in a well preserved state. It is said that Europeans have never seen the coffin, but that it is the burial place of the prophet is reasonably certain. In 892 the mosque was rebuilt, having been destroyed previously by lightning. Many of the fabulous treasures that formerly marked the burial place have long since disappeared. In the 7th century Medina was the capital of Islam. It became famed for its institutions of learning and still possesses schools that are endowed by public grants. Many gardens, fountains, orchards, and a number of fine buildings are maintained in the city. Population, 1922, 48,050.

MEDINA, a village of New York, in Orleans County, on Oak Orchard Creek, forty miles west of Rochester. It is on the Erie Canal and the New York Central and Hudson River Railroad. The surrounding country is agricultural and in its vicinity are valuable sandstone quarries. The public library, the townhall, and the high school are among the chief buildings. It has manufactures of cigars, boots and shoes, flour, and machinery. The first settlement on its site was made in 1830 and it was incorporated in 1832. Population, 1905, 5,114; in 1925, 6,192.

MEDITERRANEAN SEA (mĕd-ĭ-tĕr-rā′-nē-ạn), the great inland sea which is inclosed by Europe, Africa, and Asia, constituting the largest inland body of water in the world. The length from east to west is 2,275 miles, the general breadth is from 75 to 500 miles, but its greatest width in the Adriatic extension is fully 1,075 miles. The Strait of Gibraltar is its only connection with the Atlantic Ocean, from which it extends eastward to Arabia, and it is con-

nected with the Red Sea and the Indian Ocean by the Suez Canal. Among the important inlets are the Adriatic Sea, the Aegean Sea, the Gulf of Sidra, the Balearic Sea, the Ionian Sea, the Tyrrhenian Sea, and the Gulf of Cabes. It is connected with the Black Sea by the Dardanelles Strait, the Sea of Marmora, and the Bosporus Strait. Numerous islands abound, the most important being Sardinia, Corsica, Sicily, Crete, Cyprus, Malta, the Ionian Isles, the Balearic Isles, and Rhodes. Many important rivers discharge their waters into the Mediterranean, among them the Nile, Ebro, Rhone, and Po, but the evaporation is in excess of the natural inflow. If it were not for its connection with the Atlantic Ocean, its water would become more densely laden with salt, and finally would shrink into at least two smaller bodies; the division would come in a somewhat curved line between Italy and Tunis. On its shores and some of the islands are the most famous volcanoes in the world, including Stromboli, Vesuvius, and Aetna. Destructive earthquakes have occurred at various times. The general depth is from 30 to 2,125 fathoms. Fine corals, sponges, and fin fish abound in great quantities, while as a highway for traffic it is of vast importance. Many of the countries bordering on the Mediterranean have been prominent in the history and civilization of the world, among them Egypt, Greece, Italy, Asia Minor, and Palestine.

MEDULLA OBLONGATA (mĕ-dŭl'lȧ ŏb-lŏn-gā'tȧ). See **Brain.**

MEDUSA (mĕ-dū'sȧ), in mythology, one of the three daughters of Phorcys and Ceto, who were the personification of the benumbing sensations which result from sudden and extreme fear. Medusa was the most celebrated of the three sisters and alone possessed mortality. Having taken a vow to devote her life to celibacy, she married Poseidon, and for violating this vow was horribly punished by being made to appear most loathsome. Being chagrined at her appearance, she fled from home never to return. Medusa is represented in art as a restless being, possessed of brazen claws and tusk-like teeth, hissing serpents dropping from her hair. She was related to the giant Geryones, who was slain by Hercules, and was herself killed by Perseus while guarding the garden of the Hesperides.

MEDUSAE (mĕ-dū'sē), the name of certain species of jellyfish, so called from their resemblance to the head of the fabled Medusa. The body is formed like a disk, which has long trailing feelers or tentacles, at the end of which are stinging cells. They swim by means of contracting and expanding the body and kill their prey by emitting a poisonous substance. Some of the larger species of the Atlantic coast, especially in the tropical waters of South America, are sufficiently harmful to poison bathers. The food consists of small marine animals and plants, though chiefly of small fishes and cuttlefishes, which they paralyze by pricks of the barbed darts surrounding the mouth cavity.

MEERSCHAUM (mēr'shąm), a compact, massive mineral with fine earthy texture, composed of 60.8 parts silica, 27.1 magnesia, and 12.1 water. When dry it floats on water. It was first discovered by a German who named it *meerschaum,* meaning *seafoam,* and was thought to be solidified froth made by the waves. It is found as a mineral in South Carolina, but particularly in Asia Minor, Spain, Moravia, Greece, and Turkey. Meerschaum is used principally in the manufacture of tobacco pipes. The best products represent much value. Cheaper grades of pipes are made from waste material, which is ground and held together by a paste.

MEGAPHONE (mĕg'ȧ-fōn), a kind of speaking trumpet invented by Thomas A. Edison in 1878, by which it is possible to hear a whisper fully 1,000 feet. At one end is a tube to fit the mouth and the other end has a large funnel of tin or papier-maché. The construction of the funnel is such that the sound waves issue from it in approximately parallel directions. The best effect is secured by carefully grading the instrument to the voice of the user, since the size and shape determine the amount in which the sounds are strengthened. With this instrument it is possible to carry on a conversation at a distance of several miles, in which case it is necessary to use two megaphones.

MEGATHERIUM (mĕg-ȧ-thē'rĭ-ŭm), a genus of extinct edentates, of which remains have been found in the Tertiary, or pampas, deposits near Buenos Ayres and other parts of South America. These animals were mammals, had feet adapted for walking on the ground, and were allied to the sloths. In 1832 the remains of an animal of this class were found about nine miles from Buenos Ayres, which, in a mounted condition, give evidence that the animal was eight feet tall and the body was eighteen feet in length. The tail was six feet long. These animals lived on vegetables, which is evidenced by the size of their teeth and by the fore feet being adapted for scratching roots out of the ground.

MEHEMET ALI (mȧ'hę-mĕt ä'lē), Viceroy of Egypt, born at Kavala, Macedonia, in 1769; died Aug. 2, 1849. He enlisted in the Turkish army when still young, operated against the French in 1799, and in recognition of successes was made commander of the Egyptian army. The Turkish Porte recognized him Viceroy of Egypt in 1806, and, after disputes with the Mamelukes, who had ruled Egypt for many years, he caused 470 of their number to be massacred at Cairo in 1811. A remnant of the Mamelukes escaped to Nubia, but these he utterly exterminated in 1820. Subsequently he operated against a religious sect of Arabia, the Wahabees, and with the aid of his son, Ibrahim Pasha, secured the annexation of Hejaz to his dominion. Later he conquered Cordofan,

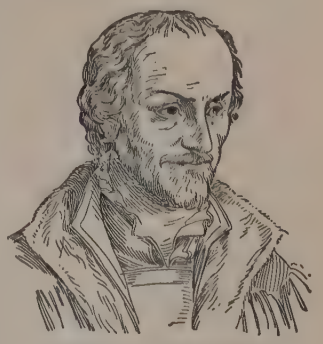
opened a large slave trade from Central Africa, and began to organize his army according to European discipline. In 1827 he fought with the Sultan to reduce Morea, but his fleet was destroyed entirely at Navarino. His son, Ibrahim Pasha, succeeded him in 1848.

MEIGHEN, Arthur, public man, born in the Province of Ontario in 1874. He was educated in the University of Toronto, where he studied law and graduated with honors in mathematics, and soon removed to Winnipeg to teach mathematics in the Winnipeg Business College. Subsequently he established a lucrative law practice at Portage la Prairie, Manitoba, and was successively elected to the Dominion House of Commons. He favored the military service act, which introduced compulsory service, and was throughout his public career an able advocate of tariff legislation and Canadian nationalism. In 1920 he was chosen Premier of Canada, being the youngest prime minister since confederation. The Conservatives, to which he belongs, were defeated in the election of 1926, and he was succeeded as Premier by Mackenzie King.

MEISSONIER (mā-sŏ-nyā'), **Jean Louis Ernest,** painter, born in Lyons, France, Feb. 21, 1815; died in Paris, Jan. 31, 1891. He was the son of a pharmacist, studied art as a profession in Paris, but later received additional training in Rome and Switzerland. In 1834 he displayed a number of productions, mostly book illustrations, and in 1836 exhibited his painting "The Visitors" at the Salon. His works are elaborate in finish, perfect in local coloring, and characterized by an execution that always impresses the observer to admire them. A famous picture of Napoleon sold for $60,000 and another of later finish was bought in Paris for $100,000. About 400 of his paintings are in existence, 60 of which are owned by people in the United States, and all have considerable value. In 1867 he was made commander of the Legion of Honor, became a member of the institute in 1861, and was granted distinguished honors at exhibitions and by the sovereigns of various countries. His best known productions include "Napoleon III. at Solferino," "La Rixe," "The Smoker," "The Cavalry Charge," "Napoleon I. at Friedland," and "The Retreat from Moscow."

MEKONG (mā-kŏng'), **or Cambodia,** one of the largest and most important rivers in Southern Asia. It rises on the northern slope of the Himalaya Mountains, thence it flows nearly east, and after a bold turn has a southeasterly course, flowing into the China Sea by a delta. The length is about 2,650 miles. It courses through a fertile region, has many rapids, and is remarkable for the swiftness of its current. Large vessels navigate 200 miles.

MELANCHTHON (mē-lăŋk'thŭn), **Philipp,** religious reformer, born at Bretten, Germany, Feb. 16, 1497; died in Wittenberg, April 19, 1560. Originally his name was Schwarzerd, meaning black earth, and this he changed to Melancthon, its Greek equivalent. His education was secured at the University of Heidelberg, where he graduated in 1512, and was awarded a master's degree two years later at Tübingen. At the latter city he studied theology, where he lectured on the philosophy of Aristotle, and soon after published a grammar of the Greek language. The Elector of Saxony appointed him professor of Greek at the University of Wittenberg in 1518, where he gave the education of Germany a new impetus, and while there formed the acquaintance and close friendship of Martin Luther. When the Reformation was making rapid progress, he became touched with the spirit of reform and threw himself with some degree of caution but intense earnestness into the movement. In 1517 he coöperated with Luther in translating the Scriptures and, while Luther was confined at Wartburg, he was the virtual head of the Reformation at the University.



PHILIPP MELANCHTHON.

He published the first treatise on Protestant theology in 1821, a work that went through many editions even in his lifetime, and since has been regarded one of the most noted productions of early Protestantism. In 1530 he occupied the position of leader at the diet of Augsburg, and shortly after published his "Apology for the Augsburg Confession." He is the accredited author of the "Confession," which was adopted under his advice and met the approval of the German princes. Melanchthon was a teacher of more than ordinary force, attracting students from all parts of Europe, and both in habit and practice was a theologian and scholar. As a writer he was prolific. He prepared a large number of official documents, ethical and doctrinal works, commentaries on the Bible, various commentaries on classics and the Septuagint, and many other productions that have come down to the present time and are still consulted in all parts of the civilized world.

NELLIE MELBA.

MELBA, Nellie, operatic singer, born in Melbourne, Australia, May 19, 1865. Her real name

was Nellie Mitchell and the name Melba was adopted from her native city. She sang ballads when she was six years of age. After studying in Paris, France, she made her début in 1887 at Brussels, Belgium. In 1893 she toured Canada and the United States and subsequently played with much success in Europe and America. Her chief rôles were as *Lucia, Juliette,* and *Ophelia.* As a soprano soloist she attained to much popularity.

MELBOURNE (měl'bûrn), a city of Australia, capital of Victoria, on the Yarra River, at the north end of Port Phillip Bay. It is the converging center of several railroads. The site is on the undulating region which extends along both sides of the Yarra River. The streets are regularly platted, crossing each other at right angles, and many of them are substantially paved with granite and asphalt. An extensive system of electric railways furnishes transportation facilities to all parts of the city and many interurban and suburban points. Water is conveyed from a point eighteen miles distant by the Yan-Yean waterworks, which are owned and operated by the city. Electric and gas lighting, sanitary sewerage, and several public parks and botanical gardens are among the public improvements.

The architecture is modern and substantial. Many of the business blocks and office buildings range in height from ten to sixteen stories. The Parliament houses, erected at the cost of $5,500,000, occupy an imposing and centrally located site. It is the seat of Melbourne University, one of the largest state endowed institutions of Australia. Other public buildings include an immigrants' home, the county and city courts, the public library, the customhouse, several orphan asylums, and a number of benevolent and scientific institutions. It has many fine churches and public schools.

The city is important as a manufacturing and commercial center. Along the north side of the Yarra River is an extensive wharfage, which is reached by vessels drawing 16 feet of water, and the outer harbor has a depth of 25 feet at low tide. The trade consists chiefly in grain, wool, fruits, live stock, machinery, and clothing. Melbourne has first rank among the colonial ports of Great Britain and the commercial centers of the Southern Hemisphere. It has large elevators, tanneries, flour mills, slaughterhouses, machine shops, woolen and cloth factories, and iron foundries. A large per cent. of the manufacturing and about six-sevenths of the commerce of Victoria is carried on at Melbourne. It has a large jobbing trade with interior points.

The first settlement on the site of Melbourne was made in 1835. Two years later it was named from Lord Melbourne. It was incorporated in 1842 and in 1851 became the capital of the colony of Victoria. The discovery of gold soon after caused it to grow rapidly in population and commercial importance. In 1888 it was the seat of an international exhibition to commemorate the founding of the first Australian colony in 1788. It was chosen as the temporary capital of the Commonwealth of Australia in 1901, but the capital was moved to Bombala, New South Wales, in 1903. Population, 1906, 526,395; in 1921, 766,506.

MELBOURNE, William Lamb, statesman, born in London, England, in 1779; died Nov. 24, 1848. He received a liberal education at Cambridge and Glasgow, was called to the bar, and in 1805 became a member of the House of Commons. In 1828 he succeeded his father in the House of Lords, became Home Secretary in 1830, and in 1834 was made Premier. He was chosen, in 1837, to instruct Queen Victoria in the various duties of her high office. His administration was succeeded by that of Sir Robert Peel in 1841.

MELCHIZEDEK (mel-kĭz'e-dĕk), a person mentioned in the Scriptures as a priest and called King of *Salem,* that term being the accepted poetical name for Jerusalem. It is related that he met Abraham when returning from an expedition, giving him bread and wine and blessing him in the name of the supreme God. Abraham thereupon delivered to him a tenth of the goods conquered in battle. Melchizedek is mentioned in one of the Psalms (cx., 4) as a priest. He is referred to in the Epistle to the Hebrews as a type of Jesus.

MELEAGER (mĕl-ê-ā'jẽr), in Greek legend, the husband of Cleopatra and a distinguished member of the Argonautic expedition. He took part in the Calydonian boar hunt and killed the boar which Artemis had sent to ravage the fields of Calydon, because Oeneus did not worship her with sacrifices. When Meleager died, Cleopatra hanged herself and his sisters wept for him until they were changed into guinea fowls by Artemis. Several statues of Meleager are extant, including those at Berlin and in the Vatican.

MELEGNANO (mā-lā-nyä'nō), a town of northern Italy, formerly called Marignano, about ten miles southeast of Milan. It is celebrated in history as the scene of an important battle, in 1815, when Francis I. of France defeated the Swiss troops under the Duke of Milan in a decisive engagement. About 20,000 men were slain. Another victory was gained at the same place by the French with a force of 16,000 men on June 8, 1859, defeating the Austrians with a loss of 1,400 men. The first named battle is sometimes called the Battle of the Giants.

MELLEN, Charles Sanger, capitalist, born at Lowell, Mass., August 16, 1851. He became a clerk in the office of a railway cashier in 1869, and soon won promotions by carefully devoting himself to the work at hand. In 1889 he was made general traffic manager of the Union Pacific system, serving until 1892, when he was elected to a similar position of the New York

and New England Railway. Soon after he became president of the Northern Pacific Railway, serving until 1903, when he was elected president of the New Haven & Hartford Ry.

MELLON, Andrew William, public man, born at Pittsburgh, Pa., in 1852. He studied at Western University (Pittsburgh) and became associated with Henry C. Frick in developing mining and manufacturing enterprises. In later years he turned his attention chiefly to banking enterprises and larger financial matters. President Harding, in 1921, made him Secretary of the Treasury.

MELODEON (mē-lō'dē-ŭn), a wind instrument resembling a piano in appearance, but constructed so that music is produced by means of bellows and reeds. The principle employed is the same as that of the accordion, pressure on the key driving down the pin and the valve, thus allowing passage to the air. The cabinet organ has generally superseded the melodeon, to which it is quite similar.

MELODRAMA (měl-ō-drä'mà), a term now used to designate a play of strong situations, resembling the sensational drama. It is bold in its several parts and is not particularly artistic in finish. At various passages thrilling music is introduced to enliven the spectators. This class of drama is used most frequently in second-class theaters, in which sentiment is exaggerated and the situations presented are distinctly striking.

MELODY (měl'ō-dỹ), in music, a rhythmical succession of single tones, so related together as to form a musical whole. Melody ranges principally within a given key. It is pleasing to the ear and has a characteristic expression. A mere succession of sounds without form, rhythm, and symmetrical arrangement cannot be called a melody. *Harmony* differs from melody in that it is an agreement of tones, while *melody* is a rhythmical succession of single tones.

MELON (měl'ŭn), a favorite annual fruit which is cultivated extensively in the Temperate Zone. It is thought to be native to the Kalmuck country in Tartary, but its present great variety of species and valuable qualities are due to cultivation and scientific propagation. It is known that melons were cultivated by the early Egyptians. They were mentioned by Theophrastus, Hippocrates, Pliny, and other Greek writers. The melon is herbaceous, has a climbing or trailing vine, and bears most successfully in a sandy loam. Both the *muskmelon* and the *watermelon* are cultivated to be eaten fresh and as preserves. However, these grow on widely different vines and the former includes the species known as *nutmeg* and *cantaloupe*.

MELOS (mē'lŏs), formerly called Milos, or Milo, an island in the German Archipelago, situated southeast of the Gulf of Aegina, belonging to the Cyclades. It is famous in Grecian history. The island has an area of 64 square miles. Mount Saint Elias, the highest peak, has an elevation of 2,539 feet. Grain, grapes, and vegetables are the chief crops. The statue known as the Venus of Milo was discovered on the island in 1820 and is now in the Louvre at Paris. Melos was rich and populous in ancient times, but was devastated by the Peloponnesian War. Population, 1922, 5,345.

MELPOMENE (měl-pŏm'ę-nē), in mythology, the muse that presided over Greek tragedy. She was said to be a daughter of Zeus, and in statuary she is represented as a young woman arrayed in splendid garments, wearing a wreath of fine leaves on her head. In one hand she has the sword of Hercules, and in the other a crown or scepter.

MELROSE (měl'rōz), a city of Massachusetts, in Middlesex County, nine miles north of Boston, of which it is a suburb. It is on the Boston and Maine Railroad and on several electric railway lines. The noteworthy buildings include the public library, the city hall, and many schools and churches. Spot Pond is a large reservoir and Middlesex Fells is a reservation of 170 acres. The manufactures include sewing-machine needles, boots and shoes, silver polish, rubber goods, and machinery. It was settled in 1632 and incorporated in 1650, but did not become a city until 1900. Population, 1905, 14,294; in 1925, 20,165.

MELVILLE (měl'vĭl), **George Wallace,** engineer, born in New York City, Jan. 10, 1841; died March 17, 1912. He entered the navy after studying in New York City. From midshipman, a rank he held in 1861, he passed successively to the higher ranks until he was made commodore in 1887. His service in the Civil War was efficient, taking part in many hazardous engagements, and subsequently became naval engineer. In 1879 he visited the Arctic seas in an exploring expedition under George W. De Long in the *Jeannette* and, after that vessel sunk in 1881, he commanded a division of the party that sailed in boats. In September of the same year his party reached the mouth of the Lena River, in Asia, and later he discovered the remains of De Long and those of his eleven companions. Melville contributed largely to the building of the United States navy by designing triple-screw machinery. He invented an improved smokestack for steamships. He is the author of "Delta," a work containing a history of the *Jeannette* and the Arctic expedition.

MELVILLE ISLAND, an island in the Arctic Ocean, located between Bathurst and Prince Patrick's islands. It was discovered by Captain Parry in 1819, while he was sailing in the Arctic off the shores of North America. The island is about 200 miles long and from 20 to 90 miles wide. It has deposits of coal and limestone.

MELVILLE PENINSULA, a point of land extending north of Hudson Bay, bounded on the North by Fury and Hecla straits, East by Fox Channel, and West by Boothia Gulf. It is connected with the mainland by Rae Isthmus. This

peninsula belongs to Canada, forming a part of Kewatin.

MEMBRANE (mĕm'brān), a thin and wide expansion of any tissue of the body, divided by anatomists into serous, mucous, and fibrous membranes. *Serous* membrane covers the joints of bones and the delicate internal organs, like the heart, their purpose being to prevent friction. *Mucous* membrane lines the internal passages, such as the throat, mouth, stomach, bowels, nose, and others, and may be seen at the lips, nasal passages, and eyelids. The function of the *fibrous* membrane is to strengthen articulations between tissues and membraneous formations. Fluids are secreted whereby the membranes are kept moist, thus facilitating articulated motion. They serve to strengthen muscles, tendons, and the various organs. Those surrounding the brain are among the most important, and are called the *dura mater, arachnoid, pia mater,* and *falx.*

MEMEL (mā'mĕl), a city of Germany, in East Prussia, on the Kurisches Haff. It is important as a Baltic seaport and has a large trade. The Russians captured it in 1914 but it was retaken by the Germans. Population, 1922, 26,548.

MEMLING (mĕm'lĭng), **Hans,** eminent painter, born at Mömlingen, Germany, in 1430; died in 1494. Among the most noted of his products are "The Shrine of Saint Ursula," "The Crucifixion," "The Seven Sorrows of the Virgin," "The Last Judgment," "The Marriage of Saint Catharine," and "Saint Christopher and the Infant Christ."

MEMMINGER (mĕm'mĭn-jĕr), **Christopher Gustavus,** public man, born in Württemberg, Germany, Jan. 9, 1803; died March 7, 1888. He was brought to the United States at an early age and settled in South Carolina, where he was adopted by Thomas Bennett, who afterward became Governor. In 1820 he graduated at South Carolina College, studied law and was admitted to the bar at Charleston, and began a successful practice of his profession. He was prominent as a leader and wrote a book against the policy of John C. Calhoun, entitled "Book of Nullification." In 1836 he was elected to the State Legislature, in which he was an influential member for nearly twenty years. He took part in the convention of 1860 that declared in favor of secession and was chosen Secretary of the Treasury for the Confederate States. This position he resigned in 1864, after which he lived in retirement.

MEMNON (mĕm'nŏn), in Greek mythology, a hero of the Trojan War, who was slain by Achilles. He was an Ethiopian, the son of Aurora, and came as an ally of the Trojans to aid them by a powerful reënforcement of Negroes. His band of warriors rushed into a center of combatants, when he slew Antilochus, but he was mortally wounded immediately after by Achilles. Later his name became associated with one of two statues in Egypt, which, on account of its size, was regarded one of the seven wonders of the world. The statue stood about seventy feet high and at sunrise every morning gave out a peculiar sound, but after the time of Emperor Severus the sound ceased. It is conjectured that the sound was produced by a person concealed within a square hole, by striking a stone with a hammer, thus producing a peculiar metallic ring.

MEMORY (mĕm'ŏ-rỹ), the power which brings before the mind concepts of absent objects as they are or were and recognizes them. It is the conscious representation of past experience. This definition includes reproduction and recognition, and a complete act of memory takes place only when both occur. Frequently former concepts are brought before the mind by reproduction, but they are often not recognized as former concepts, in which case the act of memory is incomplete, as it includes only reproduction. Remembrance is usually regarded a generic term and is used to express any act of memory, while recollection implies an intentional act of memory and is properly specific. Recollection is the power the mind has to recall former concepts and is defined as voluntary remembrance.

MEMPHIS (mĕm'fĭs), a city of Tennessee, county seat of Shelby County, on the Mississippi River, 454 miles below Saint Louis, Mo. It is on the Illinois Central, the Missouri Pacific, the Saint Louis and San Francisco, the Louisville and Nashville, the Southern, the Chicago, Rock Island and Pacific, the Saint Louis Southwestern, and other railroads. Additional transportation facilities are afforded by urban and interurban electric railways and steamboat communication on the Mississippi. The site is on a series of bluffs that have an elevation of about 45 feet above high-water mark. It is well platted, has regular and well-improved streets, and contains much substantial architecture of stone and pressed brick.

The surrounding country being fertile, Memphis has a large trade in cotton, corn, wheat, lumber, wool, and live stock. It is the most important inland cotton market of North America and produces vast quantities of cotton goods. Other manufactures include machinery, cottonseed oil, furniture, flour, tobacco, lumber products, farming utensils, brick and tile, confectionery, clothing, railroad cars, saddlery, paper and pulp, and ironware. It has extensive railroad shops and roundhouses. The wholesale and jobbing trade in dry goods, groceries, shoes, and general merchandise is very large, supplying many towns and cities of the South and the Southwest.

Memphis has a public park with fine trees and shrubs in the heart of the city and the total park area is about 1,000 acres. The noteworthy buildings include the Federal customhouse, the county courthouse, the Cotton Exchange, the

Cossitt Library, the Auditorium, the Lyceum Theater, the Masonic Temple, the Hotel Peabody, the Odd Fellows' Building, and many business and office buildings. Among the charitable and educational institutions are the Saint Joseph's Hospital, the Christian Brothers' College, the Le Moyne Normal Institute, the Hannibal Medical College, and the Memphis Hospital Medical College. The National Cemetery contains 14,039 graves.

The French built a fort on the site of Memphis in 1698 and the Spaniards occupied it in 1794. Andrew Jackson and a number of others founded a permanent settlement here in 1819. It was incorporated as a town in 1826 and became a city in 1849. The Federals held it during the greater part of the Civil War. In 1878 the yellow fever epidemic became widespread, but since then extended sanitary reforms have been effected and Memphis is now a healthful city. It has a vast system of subsoil drainage, sanitary sewers, substantial paving, electric lights and street railways, and a fine supply of city water. Population, 1920, 162,351.

MEMPHIS, an ancient city of Egypt, about ten miles south of Cairo, capital of the old Egyptian empire. It was founded by Menes, the first King of Egypt, on the banks of the Nile, and this first historical king changed the main channel of the river by building embankments to protect the city. It is evident that Memphis was a city of much importance from a very early period. As early as 1500 B. C. it contained many public buildings, fortifications, and great temples. Among the places of worship were the Temple of Serapis, the Temple of Phra, and the Temple of Ptah. The trade extended through many centuries and was furthered by water communications with the Mediterranean and the Red Sea. It had many educational institutions, making it the center of Egyptian learning for nearly ten centuries. In the time of Alexandria's greatest prosperity Memphis was the second city of Egypt, and at the time of the Moslem conquest it still had importance, but was in a state of decline. After its fall and destruction, many of the materials were carried to build up other cities, but there still remain a number of relics of interest, among them the great statue of Rameses II., the pyramid of Cheops, and numerous ruins of temples and palaces. All the remains were covered more or less with a sandy soil, but many of them have been excavated. The village of Mitrahenny now stands on the site of the city. In the Old Testament Memphis is mentioned as Noph and as Moph.

MEMPHREMAGOG (mĕm-frē-mā'gŏg), a lake of North America, extending from Quebec into Vermont. The length is thirty-five miles and the width is from two to five miles. It contains a number of picturesque islands. Fine timber is found on the islands and in the vicinity of the lake. Its abundance of food fish and beautiful scenery make it a popular summer resort. Mount Oxford is near the lake and has a height of 3,500 feet above its surface. It discharges by the Magog River, through the Saint Francis, into the Saint Lawrence.

MENAI STRAIT (mĕn'ī), a channel extending between Wales and the island of Anglesea, connecting Saint George's channel with the southeastern part of the Irish Sea. The length is fifteen miles and the breadth is from about one-fourth of a mile to two miles. It is utilized extensively for navigation. Several substantial bridges cross the strait, of which the most important is the Britannia tubular iron railway bridge built in 1850.

MENAM (mā-näm'), an important river of Southern Asia, having its source in the Laos country. It flows in a southerly direction for 900 miles and discharges into the Gulf of Siam fifteen miles below Bangkok, to which city it is navigable by large steamers.

MENASHA (mē-năsh'ā), a city of Wisconsin, in Winnebago County, on Lake Winnebago, at the mouth of the Fox River, seventeen miles north of Oshkosh. It is on the Soo Line, the Chicago and Northwestern, and the Chicago, Milwaukee and Saint Paul railroads. The place has fine buildings and is popular as a summer resort. It has a growing trade in produce and merchandise. Among the manufactures are furniture, paper, farming machinery, cigars, and flour. Menasha was settled in 1847 and chartered as a city in 1874. Population, 1905, 5,960; in 1920, 7,214.

MENDELSSOHN-BARTHOLDY (mĕn'-dĕls-sōn bär-tōl'dē), **Felix,** musical composer, born in Hamburg, Germany, Feb. 3, 1809; died at Leipzig, Nov. 4, 1847. His father was an eminent banker and his grandfather, Moses Mendelssohn (1729-1786), was famous as a philosopher and author. The family was of Jewish descent, but Felix was brought up in the Lutheran faith, his father's family having embraced that form of religion. He began the study of music when only eight years of age, played in a concert in Berlin at ten, and at eleven began to compose successfully. In 1824 he appeared at Paris and later made a tour through Germany, Austria, and Italy, receiving everywhere the plaudits of large audiences. His excellent overture to Shakespeare's "Mid-Summer Night's Dream" appeared in 1825. In it he gave expression to his musical inspiration by a blending of the delicate, fanciful, and grotesque. About that

MENDELSSOHN-BARTHOLDY.

time he formed the warm friendship of Weber, Goethe, and Moscheles, receiving from them enthusiastic recommendations.

In 1829 he appeared before the Philharmonic Society of London and about the same time visited Paris, Vienna, Munich, and Rome. His letters from Italy characterize that country as the home of art. On returning to Germany he established a musical theater at Düsseldorf for the purpose of cultivating high art, and in 1835 took charge of the Gewandhaus concerts at Leipzig. The King of Saxony appointed him musical director in 1841, and shortly after he became musical director at the Academy of Arts in Berlin under appointment by the King of Prussia. Mendelssohn ranks among the most eminent composers of the world. He was skilled in drawing and as an organist and pianist. His musical works are famous the world over and are still favorites in many countries of America and Eurasia. Some of his productions not mentioned above are "Isles of Finegal," "Saint Paul," "Elijah," "Antigone," "Songs without Words," "Oedipus," "Athalie," and "Christus."

MENDEZ PINTO (măn'dĕz pēn'tō), **Fernam,** sailor and philanthropist, born in Portugal about 1510; died near Lisbon, July 8, 1583. He volunteered his services in an expedition against the Turks, in 1537, and served on the Mediterranean Sea, the Red Sea, and the Indian Ocean for 21 years. During that time his adventures were greatly varied, being captured twelve times, sold into slavery fifteen times, and as often escaped or was ransomed. In the latter part of his public service he visited the East Indies and Japan and shortly returned to Ning-Po, China, for the purpose of inducing the Portuguese there to conquer the Japanese Islands. The expedition fitted out was lost, but Mendez returned safely to China, and later served as ambassador to Japan under appointment by the Portuguese governor of India. Besides expending his fortune in founding schools and a Roman Catholic college in Japan, he wrote an interesting autobiography, reciting in it the remarkable adventures of his life and recounting the riches of the East.

MENDICANT ORDERS (mĕn'dĭ-kant), a class of Roman Catholic religious associations, which hold to the principle of self-humiliation and religious poverty. They subsist upon alms, basing their tenets upon the words of Jesus expressed in Matthew xix., 21-30, and devote every effort of their life to religious teaching. At present the mendicant orders include the Dominicans, Franciscans, Carmelites, and Augustinians. The members of these orders and the Friars are forbidden to possess personal property as well as real estate.

MENDOZA (măn-dō'zȧ), a city of Argentina, capital of the province of Mendoza, 160 miles East of Valpariso, Chile. It is located on the eastern slope of the Andes and has railway connections with the important trade centers of the country. Electric lighting, street railways, and waterworks are among the public utilities. It is the seat of an agricultural college, two normal schools, and a convent. The surrounding country is fertile, but is subject to earthquakes. Mendoza was first settled in 1560 by the Spaniards. Population, 1922, 46,946.

MENELAUS (mĕn-ē-lā'ŭs), in Greek legend, the younger brother of Agamemnon and the husband of Helen. When his wife was carried away by Paris, the son of Priam, King of Troy, he and Ulysses proceeded to Troy to demand her restitution. This was the occasion of the famous Trojan War, in which he repeatedly distinguished himself. He engaged Paris in personal combat and would have killed him had not Venus interfered. Later he entered the city in the wooden horse, which made the capture and destruction of Troy possible. On recovering Helen, he embarked for home, but a storm drove the ship that bore him and Helen as far as Egypt. With the exception of Ulysses, he was the last of the Hellenic heroes that returned to Greece. His later days were spent in peace and prosperity.

MENÉNDEZ DE AVILÉS (mȧ-nän'dȧth dȧ ä-vē-lȧs'), **Pedro,** sailor and explorer, born in Avilés, Spain, in 1519; died in Santander, Sept. 17, 1574. He was carefully trained for the navy, attained the rank of captain general, and served under Charles V. and Philip II. In 1554 he had command of the fleet that carried Philip to England for the purpose of marrying Queen Mary. Subsequently he became governor general of the West Indies, and in 1565 sailed with 34 ships from Cadiz to establish a colony in Florida. Landing on the Florida coast, he first destroyed the settlement of French Huguenots for the reason that they were Protestants. On Sept. 8 of the same year he founded Saint Augustine, the oldest European city in the United States, and shortly after explored South Carolina, Chesapeake Bay, and a portion of the Potomac River. Menéndez was extremely cruel in the destruction of Indian villages and Protestant settlements, and consequently was attacked mercilessly by the French and Indians. His settlement at San Mateo was destroyed entirely by French Huguenots while he was in Europe, but on his return, in 1572, he retaliated by attacking the French Huguenots on the northeastern coast, which he explored with considerable care. In 1573 he was recalled by Philip II. to command a large fleet against the Netherlands and England, but died a day before the fleet was ready to sail.

MENHADEN (mĕn-hā'd'n), a fish found in abundance off the Atlantic coast of North America, often called whitefish, hardhead, and bony fish. It is allied to the herrings, but differs from them in having a deep notch in the upper jaw, and is one of the most valuable fish caught in Canada and the United States on account of its extensive yield of oil and manures. The

length is about thirteen inches, the color is greenish-brown, and the body is elongated and compressed. Nets are used in catching the menhaden. After the oil is extracted, the remaining portions are used in preparing manures, which are shipped extensively to various countries for fertilizing. The rich oils prevent the menhaden from being used extensively for food, though considerable quantities are consumed for that purpose and for bait. It is canned like sardines to a considerable extent. Menhaden oil is useful in dressing leather. The annual production exceeds in value the yield from the whale of American fisheries.

MENINGITIS (mĕn-ĭn-jī'tĭs), an inflammation of the membranes which envelop the brain and the spinal cord. These membranes, known as the *meninges,* are three in number, including the pia mater, the dura mater, and the arachnoid membranes. The disease is designated as cerebral, spinal, and cerebro-spinal, depending upon whether the inflammation is located in the cerebrum or brain, in the region of the spinal cord, or in both the brain and spine. It more frequently affects the convexity of the cerebral hemisphere than the base. In its earlier stages it is characterized by headache and later by heaviness and vomiting. The two forms of the malady are the *acute* and *chronic.* A severe case of acute meningitis generally terminates in death, while the chronic form may develop into maniacal symptoms and finally into idiocy. Improved hygiene, diet, and skillful medical treatment are essential.

MENNONITES (mĕn'nŏn-īts), a class of Protestants founded by Menno Simons (1492-1559) in the Friesland province of Holland. He became a priest in 1516, but a careful study of the New Testament caused him to withdraw from the established church and preach the reformed faith. The first permanent congregation was formed at Zurich, Switzerland, in 1525, where he was joined by Conrad Grebel, and the followers soon became numerous. The organization now has a large number of communicants in Europe and North America. Russia granted them immunity from military service to induce them to settle in that country, but in 1871 they were deprived of that privilege by the Czar. Immediately a large emigration of Mennonites began to the United States. Settlements of large numbers were founded in Minnesota, the Dakotas, Nebraska, and Kansas, and some were attracted by liberal offers to settle in Canada. The Mennonites believe firmly in the Scriptures and the fall of man, condemn infant baptism, observe foot washing, baptize believers by pouring water on their heads while kneeling, hold to close communion, and do not take official oaths. The congregation selects the pastors, who serve without pay, and usually several ministers are selected for each congregation. At present there are 12,000 communicants in Canada and 64,500 in the United States.

MENNO SIMONS (mĕn'nŏ sī'mŭns). **See Mennonites.**

MENOMINEE (mĕ-nŏm'ĭ-nē), a tribe of Algonquin Indians, formerly found in the northern part of Michigan and Wisconsin. The name means wild rice men and was applied to them because of their using the wild rice which is native to the country they inhabited. Missions were established among them by the French in 1670. They fought against the English in the French and Indian wars. At the present they are confined to a reservation near Green Bay, Wis. The total number is about 1,400, most of whom have made material advancement in educational and industrial arts.

MENOMINEE, a city in Michigan, county seat of Menominee County, on Green Bay, at the mouth of the Menominee River. It is on the Wisconsin and Michigan, the Chicago and Northwestern, and the Chicago, Milwaukee and Saint Paul railroads. The river is crossed by a number of bridges, connecting it with Marinette, Wis. Among its principal buildings are the county courthouse, the public library, the high school, and the Saint Joseph's Hospital. The manufactures include flour, candy, bread, machinery, clothing, lumber products, and earthenware. It has a large trade in lumber, iron, marble, and agricultural products. The vicinity was settled in 1799 and the city was founded in 1832. Population, 1904, 11,096; in 1920, 8,907.

MENOMONIE (mĕ-nŏm'ō-nē), a city of Wisconsin, county seat of Dunn County, on Red Cedar River, 24 miles west of Eau Claire. It is on the Chicago, Milwaukee and Saint Paul and the Chicago, Saint Paul, Minneapolis and Omaha railroads. The chief buildings include the county courthouse, the Stout Institute, the public library, and a teachers' normal school. It has a large trade in farm produce and merchandise. Among the manufactures are brick and tile, bread, candy, flour, earthenware, machinery, cigars, and lumber. It has sewerage and public waterworks. The Dunn County Asylum is near the city. Population, 1920, 5,104.

MENSCHIKOFF (mĕn'shĕ-kôf), **Alexander Danilovitch,** distinguished soldier, born in Moscow, Russia, Nov. 17 (o. s.), 1672; died Nov. 2 (o. s.), 1729. He descended from a poor family, attracted the attention of Lefort, an officer of Peter the Great, and soon after was made a page of the latter. He became distinguished in the wars against Sweden, was accorded the order of Saint Andrew, and in 1706 was made a general and a prince of the German Empire. His great-grandson, Alexander Sergeievitch Menschikoff (1787-1869), became a general of great eminence. The bravery of the latter in the Russian campaigns of 1812 and 1815 caused him to be promoted to the rank of general, in which capacity he served against the Persians. In the Crimean War of 1853 he had general command of the land and naval forces. The battles of Alma and Inkerman were lost to Rus-

sia, but he displayed much bravery at both these engagements, and conducted the attacks against Sebastopol with marked ability. In 1855 Czar Nicholas died and Menschikoff was recalled on account of failing health. In political affairs he represented the conservative party, which opposed many of the internal and military reforms.

MENSURATION (měn-shụ-rā'shŭn), the branch of mathematical science that relates to finding the length of lines, the area of surfaces, and the volume of solids. Since the area of a *triangle* is found by multiplying the base by half the perpendicular height, the area of a *plane rectilineal* figure may be found by dividing it into triangles, and then taking the sum of the area of the triangles as the total area of the figure. The area of a *trapezium* is equal to half the sum of two opposite sides multiplied by the distance separating them. The area of any *parallelogram* is equal to the area of a rectangle having the same base and height. To find the circumference of a *circle,* multiply the diameter by 3.14159; to find the area of a *circle,* multiply the square of the radius by 3.14159; to find the diameter of a circle, divide the circumference by 3.14159; to find the radius, take half the diameter. The volume of any *rectangular solid* may be found by multiplying together the length, height, and width. Volumes of similar solids are to each other as the cubes of like dimensions.

MENTONE (měn-tō'nă), or **Menton,** a city of France, in the province of Alpes-Maritimes, on the Mediterranean, twelve miles northeast of Nice. It is connected by railway with many cities of France and Italy, has a fine location near the Alps, and is a favorite resort for invalids. The surrounding country is fertile, containing many beautiful gardens and orchards. In recent times it has enjoyed the impetus that comes from large productions of crops. Near the city are a number of remains of antiquity. Population, 1922, 12,806.

MENTOR, in Greek legend, the son of Alcimus and friend of Ulysses, who intrusted to him the care of his house on his departure for the Trojan War. To him was given the care of young Telemachus. Minerva accompanied the latter on the journey in search of his father, acting the part of a wise counselor to him. The name is now applied to any wise guide or monitor.

MENTZ (měnts), or **Mainz,** a city of Germany, in Rhenish Hesse, on the Rhine, near its confluence with the Main. It has extensive railroad connections, paved streets, electric lights and street railways, and systems of sewerage and waterworks. The parks are beautified by statues, including one of Gutenberg by Thorwaldsen. It has many fine buildings, such as the Church of Saint Stephen, the Gutenberg Museum, the public library, the city hall, and the central railroad station. The library has more than 180,000 volumes. Among the manufactures are toys, carriages, hardware, furniture, musical instruments, tobacco, cotton and woolen goods, and machinery. Mentz is a city of considerable antiquity, but since the explosion of a great powder magazine, in 1857, it has been rebuilt on modern plans. In the time of Roman occupation, it was a place of considerable importance, but barbarians destroyed it in 406. By the 13th century it again rose to importance as the head of the Rhenish League of towns. The Emperor of Germany fortified it in 1871 and it now forms one of the military strongholds of the empire. Population, 1920, 110,634.

MENZEL (měn'tsel), **Adolf von,** painter, born at Breslau, Germany, Dec. 8, 1815; died Feb. 9, 1905. His father, a distinguished lithographer, gave him private instruction and subsequently he studied at the Berlin Art Academy. However, the death of his father in 1831 made it necessary for him to work as a lithographer to support the family. His series of ten drawings entitled "The Artist's Earthly Pilgrimage," illustrating Goethe's poem "Künstler's Erdenwallen," was completed in 1833, and soon after he finished "Essays on Stone" with brush and scraper, which is a splendid lithograph whose effects resemble mezzotinting. In 1839 he began the illustration of Kugler's "History of Frederick the Great," for which he drew 400 designs in pencil on wood and prepared productions in facsimile. This work occupied his time about three years and the illustrations sprang at once into popularity, owing to their realistic conception and striking originality. Though Menzel began painting without formal instruction, he embodied a new era in art before it was recognized by thousands of other artists. On the anniversary of his eightieth birthday, in 1895, he was made privy councilor and in 1899 the Order of the Black Eagle was conferred upon him. His chief works include "The Round Table of Frederick the Great," "The Coronation of William I. at Königsberg," "Frederick and His Men at Hochkirch," "The Modern Cyclops," "Carnival Morning," "Departure of the King for the Seat of War in 1870," and "Frederick the Great Traveling."

ADOLF VON MENZEL.

MEPHISTOPHELES (měf-ĭs-tŏf'ē-lēz), a name thought to be of Hebrew derivation, applied in legendry to designate one who does not love light. It was made famous by Goethe in his "Faust," in which Mephistopheles is regarded as representing the principle of evil and as demanding possession of Faust's soul, because of fulfilling his commands.

MERCATOR (mẽr-kā'tẽr), **Gerhard,** noted German mathematician and geographer, born in Rupelmonde, Flanders, May 5, 1512; died Dec. 2, 1594. His family name was Kramer, of which the name given in this article is the Latin form, by which he is known generally. He secured a liberal education at Louvain, Belgium, and devoted his attention to mathematics and geography. Charles V. retained his services a number of years, and later he became cosmographer to the Duke of Juliers and Cleves. He is noted for valuable additions to geographical research and for the invention of the projection that bears his name. By means of this projection it became possible for seamen to utilize the compass by steering in straight lines, instead of making spiral movements as required by other projections. He published descriptions and maps of France, Germany, and Europe.

MERCER (mẽr'sẽr), **Hugh,** soldier, born at Aberdeen, Scotland, in 1720; died Jan. 12, 1777. He studied at the University at Aberdeen and became a physician in the army, but emigrated to America in 1747. For some time he resided near the present site of Mercersburg, Pa., and in 1755 served under Braddock. He was wounded in the battle near Fort Duquesne and for gallant service received a medal. He took sides with the Americans in the Revolution and was made a brigadier general in 1776. At Trenton he commanded the advance column and shortly after fought at Princeton, where he was mortally wounded. In 1840 a monument was erected to his memory at Laurel Hill Cemetery, Philadelphia.

MERCHANT MARINE, the persons and vessels employed in commerce, taken collectively, either of a particular nation or of the world. The largest commercial interests have universally been represented in the cities that are located where extensive and well-protected harbors are available, and where inland routes of travel connect the port cities with a large interior country. This is especially true of the Mediterranean Sea, where Carthage, Venice, Phoenicia, and Alexandria continued as commercial centers throughout ancient and mediaeval times. During the Middle Ages the Hanseatic League was an important factor in developing the trade of Western Europe, when Hamburg, Antwerp, Bremen, and Bruges played an important part in controlling the trade of Europe. The discovery of America and the development of the East Indies caused a rivalry in trade and an interest in the acquisition of territory, through which great strides were made in commercial development by the French, Dutch, English, Portuguese, and Spanish traders. In the rivalry for trade and territory England exceeded the other nations, and the commerce of Great Britain is larger at present than that of any other country in the world.

The great forests of America stimulated an interest in shipbuilding at an early date in the Colonial times. Many vessels serviceable in mercantile enterprises were constructed at Quebec in the 17th century and shipyards were established at Boston, New York, and Philadelphia. The superiority of the American ships and the greater efficiency of their sailors made them dangerous commercial competitors to those of England and France, hence the British government began to enact navigation laws as early as 1645, with the view of requiring that all importations into the colonies were to be carried in English or Colonial-built vessels. While this legislation tended to restrict trade, it fostered shipbuilding. At present the merchant marine of the United States is second only to that of Great Britain, having a total of about 15,462,000 tons, while that of Great Britain has about 19,295,000 tons. At the time of the Civil War, in 1861, the tonnage was 5,539,813, but during the war and for some time after it declined materially, due to the fact that income taxes and heavy taxes on gross receipts greatly handicapped shipowners. Japan holds third rank, having a tonnage of 3,919,807. Holland, 2,618,831; Norway, 2,680,642; Italy, 3,128,661; Germany, 3,373,713; and France, 3,512,984.

MERCIER (mâr-syā'), **Honoré,** statesman, born in Quebec, Canada, October 15, 1840; died October 30, 1894. He was educated at Saint Mary's College, Montreal, and was admitted to the bar in 1867. For some time he edited a French newspaper and in 1872 was elected to the Parliament of Canada, serving until 1874, when he became a member of the Assembly in the Province of Quebec. In 1879 he was made Attorney-General, became Premier in 1886, and served in the Quebec House of Assembly until 1891, when the administration was dismissed for corruption, though he was not charged with being personally implicated.

MERCURY (mẽr'kū-rỹ), the Roman god of commerce and gain, later identified with the Greek Hermes. The Romans ascribed magic power to him, set May 25 apart as his festival, and erected temples to his honor at the Circus Maximus. They likewise dedicated a temple and a sacred fount to him near the Porta Capena. Marine merchants thought it necessary to go to the fount and sprinkle themselves and their merchandise with holy water in order to insure large profits on their wares. The Grecians connected Hermes quite generally with domestic life and built many images to him in their cities, gymnasia, and other places of resort. He is represented as the son of Zeus and Maya by the Greeks, who regarded him the guardian of commerce, eloquence, and robbers. In statuary he is seen with wings attached to his shoulders or feet and a staff in his hand, and his head is ornamented with a broad-brimmed hat. Many specimens of Greek and Roman sculpture of this divinity are still extant.

MERCURY, the planet nearest to the sun, unless it can be definitely established that the sup-

posed Vulcan really exists. The most ancient account that we have of this planet is given by Ptolemy, who speaks of its location on the 15th of November, 265 B. C., and the earliest Chinese account of it describes its location on June 9, 118 A. D. Its rapidity of flight caused the ancients to name quicksilver after it. Mercury has an average distance of 35,550,000 miles from the sun and is 3,100 miles in diameter. Its volume is about one-eighteenth that of the earth, but its density is one-eighth greater. The inclination of the orbit of Mercury to the ecliptic is 70° 0′ 8″. Its sidereal revolution around the sun occurs in 87.96 days and a synodic revolution requires about 116 days. The greatest distance from the earth is 136,000,000 and its least distance is 47,000,000 miles. The rotation on its axis was formerly thought to be completed every 24 hours, but astronomers now agree that it turns on its axis only once in going around the sun. For this reason the year and the sidereal day are equal in length. It has no moon to light the sky at night. In the spring and autumn Mercury is visible to the naked eye before sunrise and after sunset. Its greatest distance from the sun is 43,000,000 miles and the least distance is 30,000,000 miles; thus, there is about double the amount of light and heat derived from the sun when it is in perihelion as when in aphelion, these positions being occupied every 44 days. Transits of Mercury occur more frequently than those of Venus and take place at intervals of from three to thirteen years, having occurred in 1832, 1845, 1848, 1861, 1868, 1881, 1891, 1894, etc. The transits occur only in May and November and the greatest length can be only seven hours fifty minutes, though the majority are of much shorter duration. A transit to occur in 1924 approaches near the longest period of duration.

MERCURY, or **Quicksilver,** a metallic element known from the earliest historical times, the only liquid metal at ordinary temperatures. It freezes at 39.5° Fahr. below zero, gradually expands when heated, and boils at 357.25°. At 360° it rises in fumes and becomes gradually converted into a red oxide. At the ordinary temperatures it has a silvery-white color, runs in separate round drops with a smooth surface, and if impure the drops are somewhat elongated. Mercury occurs in a pure state, but is found most frequently in the form of sulphide, or cinnabar, and is mined in that form in California, Austria, Germany, Italy, Mexico, Peru, China, Borneo, and other countries. It is extracted from the sulphide by roasting the ore in a furnace, thus causing the sulphurous acid to escape, while the mercury is condensed in a chamber. Mercury is used in the preparation of the most powerful poisonous compounds and serves many useful purposes in medicines. In thermometers it is employed to indicate the temperature of the air, its high state of expansibility ranging between the boiling and freezing point, while in barometers it is used to ascertain the weight of the atmosphere. Alloys in which mercury is used are called *amalgams.* An amalgam of tin and mercury is of value in preparing mirrors, while others are useful in filling and gilding teeth. It enters largely into the chemical laboratory, in making physical instruments, and in imparting a degree of softness and fusibility to other metals.

MERCY, Sisters of, an organization of the Roman Catholic Church. It was founded at Dublin, Ireland, by Catherine Elizabeth McAuley in 1827. The original organization was designed to provide relief for orphans, destitute women, and others, but it soon assumed a religious character. In 1834 it was approved by Pope Gregory XVI. The organizer became the first mother superior of the associations, and before her death there were 43 branches of the order. Bishop O'Connor introduced the order into the countries of North America in 1839. At present communities of Sisters of Mercy are distributed widely in America, Australia, Europe, and other grand divisions. The two classes of sisters are known as choir and lay-religious, and are bound by vows to seek the betterment of conditions for the ignorant, poor, and sick.

MERCY SEAT, the name of the covering of the ark of the covenant, called *Kapporeth* by the Jews. It was 27 inches wide and 45 inches long and was made entirely of gold. At each of the ends was a figure of gold, called the *cherubim,* and a wing of one met that of the other so as to cover the *Kalloreth.* The high priests entered the holy of holies on the day of atonement, when incense was burned and the blood of the sacrifice was sprinkled on the mercy seat as an atonement for the sins of the nation.

MER DE GLACE (mâr dẹ glàs), a celebrated glacier of Switzerland. It descends from the slopes of the range of Mont Blanc and is formed by the confluence of three large glaciers, known as Lechaud, Géant, and Talèfre. The different tributaries form far up in the mountain range, descend slowly until they merge into the Mer de Glace, or Sea of Ice, which descends a long distance into the fertile valley below, carrying with it large quantities of bowlders from five to thirty feet in diameter, vast crevasses appearing at various bends in the course. The frozen mass of ice descends into regions studded with fine fields and orchards, but is at last melted and flows in a stream as a clear current of water.

MEREDITH (mĕr'ẽ-dĭth), **George,** novelist and poet, born in Hampshire, England, Feb. 12, 1828; died May 17, 1909. He was liberally educated and studied law, but afterward engaged in literary work. His first publication was a volume of poems, in 1851, and four years later he published a burlesque in prose, entitled "Shaving of Shagpat." Subsequently he became a prolific writer, but his style is too elaborate to attract general favor, and his composition

requires more than the ordinary amount of thought to grasp his excellent mental pictures. His principal writings include "Evan Harrington," "The Ordeal of Richard Feverel," "Tragic Comedians," "Diana of the Crossways," "The Amazing Marriage," and "Tale of Chloe."

MEREDITH, Edwin Thomas, public man, born at Avoca, Iowa, Dec. 23, 1876; died June 17, 1928. He was educated in public schools and at Highland Park College, Des Moines, and in 1902 founded *Successful Farming,* one of the leading agricultural publications in the United States. In 1920 he entered the cabinet of President Wilson as secretary of agriculture. He was the founder of the Jefferson Highway.

MERGANSER (mĕr-găn'sĕr), the name of a small subfamily of ducks, of which the *goosander* is the largest species. The bill is narrow and slender, ending with a sharp hook at the tip, and the edges are serrated. The flesh of most species is not favored for food, since they live chiefly upon fish, but the *hooded merganser* is hunted as a table duck. Both the male and female have a crest, which in the male is quite large and circular in form. This species and the *red-breasted merganser,* or *sheldrake,* which has no true crest, are widely distributed in Europe and America.

MERGENTHALER (mĕr'gẹn-tä-lẽr), **Ottmar,** inventor, born in Württemberg, Germany, May 10, 1854; died in Baltimore, Md., Oct. 28, 1899. He came to the United States at an early age and, after working as a clock maker, engaged as an electrical engineer. Though he never learned the art of a printer, his attention was called to the invention of a machine to set type, and, after experimenting ten years, he announced the completion of his celebrated linotype type-setting machine in 1886. The Mergenthaler machine has since gone largely into book and newspaper publishing offices. It greatly revolutionized the printing trade and ranks as one of the most valuable inventions ever made. Several improvements have been added, but the principles employed by the inventor are essentially unaltered.

MÉRIDA (mĕr'ĭ-dä), a city of Mexico, capital of Yucatan, 25 miles from the Gulf of Mexico and about that distance south of Progreso, a seaport town. It has good railroad connections and several public schools, and is the seat of a museum, a conservatory of music, a public library, and a university. The streets are regularly platted and contain modern municipal improvements, such as sanitary sewerage and brick and asphalt pavements. It has manufactures of cigars, sugar, clothing, spirituous liquors, soap, machinery, leather, and fabrics. Mérida was founded by the Spaniards in 1542. Population, 1906, 44,360; in 1920, 61,999.

MERIDA, a city of Venezuela, capital of the state of Los Andes, about sixty miles south of Lake Maracaibo. It is located on an elevated plateau and is surrounded by a farming and mining country. The chief buildings include a cathedral and a university. Among the manufactures are carpets, machinery, and cotton and woolen goods. Earthquakes partly destroyed the city in 1812 and in 1894. Population, 1922, 12,424.

MERIDEN (mĕr'ĭ-dẹn), a city of Connecticut, in New Haven County, eighteen miles north of New Haven. It is on the New York, New Haven and Hartford Railroad and on several electric interurban lines. The noteworthy buildings include the Curtis Memorial Library, the Meriden Hospital, the Connecticut School for Boys, the city hall, and many schools and churches. It has the Meriden Britannia Company, which is reputed the most extensive silver-plating establishment in the world. The general manufactures include steel pens, glassware, musical instruments, hardware, machinery, iron and brass castings, textile fabrics, and cutlery. Originally it was a part of Wallingford, but became a separate town in 1806 and was chartered as a city in 1867. Population, 1900, 24,296; in 1920, 29,842.

MERIDIAN (mẽ-rĭd'ĭ-ạn), a city in Mississippi, county seat of Lauderdale County, 85 miles east of Jackson. It is on the Southern, the Mobile and Ohio, and the Queen and Crescent railroads. The chief buildings include the county courthouse, the public library, the Meridian Academy, the East Mississippi Female College, and the Lincoln School. Among the manufactures are cotton and woolen goods, furniture, farming implements, lumber products, flour, and tobacco. Meridian is the second city of the State in population and is rapidly increasing its municipal facilities and commercial trade. General Sherman captured it in 1864 and destroyed the stores and railroads. Population, 1900, 14,050; in 1920, 23,436.

MERIDIAN, the great circle passing through the place where the observer stands and through both poles. Properly, there are as many meridians as places on the earth's surface. It is midday or noon at any place when the sun reaches that place. Longitude may be reckoned in degrees, minutes, and seconds east or west of any given meridian, but in geography the degrees of longitude are indicated east or west of some particular meridian. No place can have a location higher than 180° east or west, since distance is measured only one-half around the earth from the meridian taken as a basis. Books and maps used in the United States indicate distance east and west from both Washington, D. C., and Greenwich, England, but a convention held at Washington in 1884 decided that the meridian of Greenwich, England, should be taken as the basis for the world, and that the astronomical day should begin at noon from and after Jan. 1, 1885. Celestial meridians are imaginary circles that pass through the poles of heaven and the zenith of any locality on the surface of the earth.

MÉRIMÉE (mā-rē-mā'), **Prosper,** novelist and historian, born in Paris, France, Sept. 28, 1803; died Sept. 23, 1870. He studied law and was admitted to the bar, but did not practice his profession. In 1830 he entered the government service, holding various positions until 1853, when he became a senator of the empire. For some time he was instructor of ancient and historical monuments in France, regarding which he published a number of valuable books. His "Colomba," an account of the vendetta of Corsica, and his "Carmen," a romance, were widely read because of their precision and vividness. He is the author of many works in fiction, both narrative and dramatic.

MERINO (mĕ-rē'nō), a breed of domestic sheep, originally reared in Spain, but now acclimated in North America, Australia, and other grand divisions. This grade of sheep is noted for its excellent wool. It has long legs, is rather small in size, and its flesh is not highly esteemed. The males are horned and somewhat larger than the females.

MERIVALE (mĕr'ĭ-vāl), **Charles,** historian, born in London, England, March 8, 1808; died Dec. 27, 1893. He was the son of John Herman Merivale (1779-1844), a noted English scholar and translator, graduated from Cambridge in 1830, and afterward became a tutor and fellow at that institution. Later he was ordained as minister, became a preacher of the university, and in 1869 was made dean of Ely. He was chaplain to the speaker of the House of Commons for some time. His publications include "Fall of the Roman Empire," "Conversion of the Northern Nations," and "General History of Rome." His brother, Herman Merivale, was born in 1806; died Feb. 9, 1874. He is noted as an author and statesman. He graduated at Oxford in 1832, where he was appointed professor of political economy in 1837, and served a number of years as secretary for the colonies and for India. He wrote "Colonization and Colonies," "Historical Study," and "Life of Sir Henry Lawrence."

MERLIN (mĕr'lĭn), a bird of the falcon family, differing from the genus *Falco aesalon* in having longer and more slender tarsi and toes. It is bold in habits and from ten to twelve inches in length. The color of the males is somewhat variegated, having a bluish-gray tail, reddish-brown feathers on the back of the neck, bluish-gray on the head, and reddish-yellow on the breast and lower parts. The females are uniformly of a bluish-ash color. The merlin builds its nest on the ground and is sometimes used in hawking larks, quails, partridges, and other small game. Several species have been described. The common merlin of Europe resembles the American pigeon hawk.

MERLIN, Ambrosius, an ancient prophet of Wales, supposed to have lived in the 5th century. An account of him is given by Geoffrey of Monmouth, who credits him with having been an adviser of King Arthur. He is mentioned in numerous poems from the time of Spenser to that of Tennyson, the latter mentioning him in his "Idylls of the King." A collection of prophecies attributed to him have been published in German and French.

MERMAID (mĕr'mād), a fabulous marine creature, having the upper half of the body like that of a woman and the lower like a fish. It is associated with the *merman,* the male corresponding to the mermaid. These beings are represented as having their home in the sea. They are described in the legends of Northern Europe and of other regions, and have entered extensively into poetry. It is thought that the dugong, a sea mammal, has been observed in its characteristic habit of holding its young while suckling at its breast and displaying its fishlike tail when diving, and thus gave rise to many of the early legends. Mermaids are frequently represented in paintings in the attitude of combing their long and beautiful hair while seated on a rock amid the dashing waves, and stories tell of their forming marriages with men, remaining faithful wives and mothers. In some of the legends it is represented that they live for a time on land and afterward entice their husbands to occupy ocean homes in unison with them. Many of the early traditions and legends are very beautiful and teach lessons of devotion and faithfulness quite as distinctly as the traditions and folklore of heroes and early myths.

MEROVINGIANS (mĕr-ō-vĭn'jĭ-ąnz), the name derived from Merwig, who was King of the western Franks from 448 to 457. He is the founder of the Merovingian dynasty. This dynasty was the first of the Germanic kings in Gaul and was succeeded by the Carlovingian dynasty in 752. The latter was founded by Pippin the Short. Clovis was the grandson of Merwig and became the first Christian sovereign of the Franks, and Dagobert is noted as one of the most successful of the dynasty.

MERRILL (mĕr'rĭl), a city in Wisconsin, county seat of Lincoln County, on the Wisconsin River, sixteen miles above Wausau. It is on the Chicago, Milwaukee and Saint Paul Railroad and is a market for lumber and farm produce. The principal buildings include the high school, the public library, the court house, and many churches. Among the manufactures are clothing, lumber products, machinery, flour, cigars, utensils, and ironware. It has systems of sewerage and waterworks. Merrill was settled in 1875 and incorporated in 1880. Population, 1905, 9,197; in 1920, 8,068.

MERRIMAC (mĕr'rĭ-măk), a river of New Hampshire and Massachusetts. It is formed by the confluence of the Winnipiseogee and Pemigewasset rivers at Franklin, N. H., flows almost due south into Massachusetts, thence has a northeasterly course, and discharges into the Atlantic Ocean near Newburyport. It is navigable to Haverhill, about sixteen miles. The

Merrimac is noted for its important fisheries and supplies an abundance of water power. Among the thriving cities on its banks in New Hampshire are Concord, Manchester, and Nashua. The cities in Massachusetts include Lowell and Lawrence.

MERRIMAC, the name of a collier sunk by Lieutenant Hobson on June 3, 1908, at Santiago de Cuba with the view of making it impossible for the Spanish fleet to escape. Those on the vessel were captured and held prisoners by the Spaniards until July 6. This vessel was named after the *Merrimac,* a famous frigate of the Civil War. The latter had been abandoned by the Federals on Hampton Roads, but was reconstructed and renamed the *Virginia* by the Confederates. At Newport News it destroyed the *Congress* and the *Cumberland,* but was attacked by the *Monitor* on March 9, 1862, and was compelled to withdraw. In May of the same year the vessel was destroyed by the Confederates shortly before they evacuated Norfolk. See **Monitor.**

MERRITT (mĕr'rĭt), **Wesley,** soldier, born in New York City, June 16, 1836. He graduated from the West Point Military Academy in 1860, entered the service with the rank of brevet second lieutenant, and was assigned with his regiment to Utah in 1861. Subsequently he served with distinction in the Virginia campaign and rose to the rank of brevet major general, this promotion being accorded to him on account of bravery at the Battle of Gettysburg. In the Shenandoah campaign he took part in the battles of Cedar Creek, Winchester, and Fisher's Hill, and in 1865 became major general. General Grant appointed him as one of three commissioners to arrange the terms of capitulation and receive the surrender of the army of northern Virginia, and in 1866 he was mustered out of the volunteer service. In 1882 he was chosen superintendent of the Military Academy at West Point. He became major general of the regular army in 1885, and in 1898 was assigned to the new military department of the Pacific and the Philippines. In June, 1898, he sailed for Manila, and in August of the same year proceeded to Paris for the purpose of conferring with the American members of the peace commission. He retired with the rank of major general in 1900. His service in every public relation was efficient. He is recognized as an able military leader of the United States. He died Dec. 3, 1910.

MERRY DEL VAL, Rafael, cardinal and statesman, born in London, England, Oct. 10, 1865. He studied in his native city and at Brussels, and acquired ability to speak the English, German, French, Italian, and Spanish. Leo XIII. called him to fill important positions at the Vatican in 1892, where he exercised a wide influence as a statesman. In 1897 he visited Canada on an important diplomatic mission. Pius X. made him pontifical secretary of state in 1903.

MERSEY (mĕr'zĭ), a river of England, having its source by a union of the Etherow and Goyt in Derbyshire, and flowing, after a course of seventeen miles, into the Irish Sea near Liverpool. It courses through a fertile country and has been made navigable by a canal to Manchester. A tunnel passing under it connects Liverpool with Birkenhead. Sandbars at the mouth of the river were removed in 1895, and it is now possible for large vessels to enter the river when at low-water mark. The entire length is 68 miles.

MERTHYR-TYDFIL (mĕr'thĕr-tĭd'fĭl), a city of Glamorgan County, Wales, on the Taff River, 24 miles north of Cardiff. It has extensive railroad connections and is important principally on account of its extensive coal and iron mines. The streets are improved by paving, electric lighting, and waterworks. It is the seat of many important educational institutions and numerous churches. It has a large export and import trade. Population, 1921, 80,999.

MERV (mĕrf), an oasis of Asia, located in Turkestan, near the northeastern boundary of Persia. It is watered by the Murghab River, is sixty miles in length and forty in width, and has been improved by vast irrigation canals constructed under Russian supervision. The climate is favorable to the production of cotton, sugar, silk, wheat, and many varieties of fruit. Among the manufactures are cotton, woolen, and silk fabrics, carpets, and utensils. Domestic animals, such as cattle, horses, camels, and sheep, are reared. Considerable interest is taken in the mining of silver. General Skobeleff captured the oasis in 1881 and since 1883 it has been Russian territory. A railway line has been built across Merv, which extends from the Caspian Sea to within a short distance of Chinese territory. Merv is the principal town. It is located on the railway line and river and has important trade and manufacturing facilities. The inhabitants consist largely of Mongols, Arabs, Turkomans, and Russians. Merv, the capital, in 1922, had a population of 9,345.

MESENTERY (mĕs'ĕn-tĕr-ў), the broad double fold of the peritoneum, by which the small intestine is attached to the spinal column. It incloses the nerves and blood vessels that supply the intestines. Between its folds are numerous lacteals and lymphatics as well as the ganglia known as the *mesenteric glands.* These glands are about the size of an almond and number from 100 to 150. The mesentery extends nearly the entire length of the intestine and is nearly four inches wide.

MESHED (mĕsh'ĕd), or **Meshid,** a city of northeastern Persia, capital of the province of Khorassan. It is celebrated as the sacred city of the Shiites, an important sect of Mohammedans. The city has one of the most noted mosques of the Moslem world, is surrounded by a wall, and has several sepulchers, among them those of Nadir Shah, Haroun-al-Raschid, and

the Persian poet Firdusi. It is the seat of many schools, several minor mosques, public buildings, and a number of theological and secular colleges. The manufactures include clothing, jewelry, silk and cotton goods, rugs, velvets, carpets, sword blades, cutlery, and utensils. It has an important overland trade, being connected by caravan routes with Khiva, Bokhara, Herat, and Kerman. In its vicinity are productive turquoise mines. Population, 65,500.

MESMER (mĕs′mĕr), **Friedrich Anton,** eminent physician, born near Constance, Switzerland, May 23, 1734; died March 5, 1815. He was of German birth, secured a liberal education, and studied medicine at Vienna, where he secured a doctor's degree. After investigating with considerable care the subject of animal magnetism, he prepared several papers in relation to that subject and became the founder of the doctrine of *mesmerism.* In practicing upon patients he at first used magnets, claiming that magnetism exercises a marked healing influence upon the human organism, but later announced that there is sufficient magnetism in animal bodies to conduct healing operations. His first treatise on the subject was published in 1775. Three years later he settled temporarily at Paris, where he practiced the healing art with considerable success, and was offered a large compensation and an annual pension to instruct students at a hospital, but he preferred to keep his methods secret. Shortly after the French government appointed a commission to investigate his method, Benjamin Franklin serving as one of the commissioners. The report published was unfavorable to Mesmer, whereby he lost public confidence, and later returned to Switzerland, where he died in comparative obscurity.

MESMERISM (mĕz′mĕr-ĭz′m), a name originated from Friedrich Anton Mesmer, used to describe peculiar conditions produced by one individual on the nervous system of another. Mesmer believed that the stars exercise an influence over man, but later was persuaded to produce what he called *animal magnetism* by stroking the bodies of patients, thereby effecting peculiar sensations on the nervous system of those who came for treatment. In doing so he attracted general attention to the arts pursued by different individuals in early ages. Many of his followers became able to effect similar phenomena and later he reduced the system to a science. Such terms as *hypnotism, odylic force, electrobiology,* and *animal magnetism* imply practically the same art as mesmerism and are effected in substantially the same manner. Among the conditions necessary are that the person to be mesmerized gaze fixedly at some bright object, or at some individual, and that the hands of the mesmerizer be passed over him according to some fixed rule, or by having the eyes fixed steadily on some object and the operator completing the operation by breathing on the person. The patient is caused by these means to pass into a state resembling sleep and while thus affected he remains unconscious.

Various stages in mesmerism are recognized, the highest being the state of muscular rigidity. During such a state the muscles are set rigidly as in a severe case of catalepsy, and the patient may be lifted by taking hold of his feet and head, the muscular rigidity holding the body in a horizontal position. When in this state, the patient is devoid of sensation and is insensible to pain, but during a state of being slightly hypnotized he may be made to imagine various things, such as believing himself a different individual, seeing peculiar things, feeling uncommon sensations, or smelling peculiar odors. Mesmerism has been successfully employed as a therapeutic agent in various diseases, especially in sleeplessness and several others resulting from nervous derangement. Some have gone so far as to profess that they possess power to communicate with persons at a distance, to forecast the future, and to produce various other phenomena. However, these claims must be taken with some allowance. Phenomena of a similar character are attributed by some to spiritualism, by others to clairvoyance, and still others to mind reading.

The theories of spiritualism attribute the various phenomena of mesmerism to spiritual influences, while *clairvoyance* is held to be a natural trance condition, thus differing from the artificially induced mesmerism or hypnotism. *Mind reading* in the ordinary instances of contact is usually explained by *muscle reading,* but in cases of absence it is attributed to spiritual influences. *Odylic forces* is a term applied by Baron von Reichenbach to influences which he claimed exist, and by reason of them mesmeric and kindred phenomena are to be explained. *Electrobiology* attributes them to electricity produced in the body. Many scientific investigations have been made in recent years, especially of the art known as hypnotism, and much attention has been directed to it and kindred subjects at accredited institutions. Dr. Heidenhain, of Breslau, Germany, is one of the most eminent men of recent times to give the subject attention. In his work, known as "Animal Magnetism," he expresses the view that mesmeric and similar influences are brought about by producing temporary suspension of the brain forces that control voluntary motion, and that when such control is suspended it is possible to influence the senses so that involuntary movements may be produced.

MESOPOTAMIA (mĕs-ŏ-pŏ-tā′mĭ-ȧ), the name applied anciently to the region between the Euphrates and Tigris rivers, but at present it is used by Asiatic people to designate only the northern part. Anciently the entire region was associated with the monarchies of Babylonia and Assyria, when it was improved extensively by irrigation and navigation canals. The soil is

naturally fertile, but the limited amount of rainfall renders it unproductive unless artificially watered, and on that account it is used at present principally for pastoral purposes. The entire region includes about 143,250 square miles. After its conquest by the Turks, in 1515, the systems of irrigation were interfered with to some extent, on account of which much of it has fallen back to its original barren state. The principal industry is the rearing of sheep, camels, goats, and cattle, but in some localities the cultivation of tobacco, cotton, millet, barley, wheat, hemp, and fruits is the leading industry. Nineveh and Harran were among the ancient cities. The region passed successively under the dominion of Assyria, Babylonia, Persia, Greece, Rome, and Arabia. At present it is a British mandate, commonly called Iraq. Bagdad is the capital. Population, 1926, 2,850,784.

MESOZOIC (měs-ō-zō'ĭk), the name commonly applied to the geological period between the Paleozoic and the Cenozoic. The epoch is sometimes termed the Secondary period. It includes the age of reptiles. The rocks are known as Triassic, Oölitic, and Cretaceous.

MESQUITE (měs-kē'tā), a small shrub or tree native to North America, allied to the acacia. In some localities it is known as the honey pod and the honey locust. The seeds are eaten and the pods are used for stock food and for making a drink. In size the mesquite varies from a small thorny shrub to a widely branching tree fully fifty feet high. The wood is used as fuel and in some places for posts and building. The bark and wood are rich in tannic acid, hence are of value in tanning hides. Many regions of Texas, California, and Mexico have mesquite trees. Related species are found in some parts of South America, especially in Chile and Argentina.

A number of tufted grasses are known as mesquite. They are abundant in the southwestern part of the United States, where they are of much value for grazing. Since mesquite does not grow tall, it is seldom cut for hay, but it matures standing, hence furnishes excellent fodder late in the fall and during the winter.

MESSENIA (měs-sē'nĭ-ā), or **Messena,** a region of ancient Greece, in the southwestern part of the Peloponnesus, famous for its fertility and production of wheat. In the early history of Europe it possessed great opulence and power, but was vanquished by two wars with Sparta, known as the Messenian wars, the first of which took place from 743 to 724 B. C. and the second from 685 to 668 B. C. Both wars terminated in defeat to the Messenians, after which they emigrated largely to Sicily, and from them the present Messina received its name. Messenia is now the name of a Grecian nomarchy, which has an area of 1,225 square miles and a population of 196,350.

MESSIAH (měs-sī'ā), a term identical with the Greek word *Christos,* meaning the Anointed. Its equivalent, as for instance the Hebrew *mashiackh,* was applied to various gifted leaders of different nations, both Jewish and Gentile, especially those anointed with holy oil and whose reign was marked with the greatest prosperity. The prophet Daniel mentions a Messiah who was to appear and rebuild Jerusalem, but the city was to be destroyed by foreign invaders. The Jews applied the messianic prophecies as foretelling of a temporal king, who they thought would rise to liberate them from the oppression of foreigners. Jesus Christ affirmed himself to be the Messiah of Daniel's prophecy, and especially declared that the kingdom of God, based upon the truth taught by him, shall never be destroyed. All Christendom has acknowledged the claim, but according to Jewish belief the Messiah is still to be expected.

MESSINA (měs-sē'nà), a city of Sicily, capital of a province of the same name, on the Strait of Messina, 59 miles northeast of Catania. It has a beautiful location, is well built, and contains a number of modern municipal improvements. The railroad conveniences and the commodious harbor have been instrumental in developing a large trade. Fully 3,650 vessels enter its harbor annually. The manufactures include principally silk, cotton, and woolen goods, clothing, hardware, machinery, coral products, and fruit essences. It has a large trade in fresh and salt fish, fruit, pottery, cereals, and merchandise. The city has good schools, a cathedral founded in 1098, and a university established in 1548. The university has a library of 60,000 volumes and is supplemented by a number of academies, seminaries, and colleges. Emigrants from Messenia founded the city in 732 B. C. Subsequently it passed into possession of the Carthaginians, Romans, Saracens, Normans, Spaniards, and Neapolitans. In 1861 it was made a part of Italy. Several severe earthquakes damaged it severely, particularly in 1908, when the larger part of its business section and many lives were destroyed. Population, 1922, 152,468.

MESSINA, Strait of, a narrow channel between Sicily and Italy, connecting the Ionian and the Tyrrhenian seas. It is from two to twelve miles wide and twenty-six miles long. At some places it is very deep. The tide is irregular and the current is swift, hence navigation is somewhat dangerous. Messina and Reggio, two important ports, are located, respectively, on its western and eastern shores. Both were greatly damaged by an earthquake in 1908. See **Scylla and Charybdis.**

META (mā'tà), a river of South America, which has its source in the Andean Mountains. It flows northeast a distance of 700 miles and joins the Orinoco in Venezuela. The larger portion of its course is through Colombia. The valley of the Meta is noted for its fertility and luxuriant vegetation.

METALLURGY (mĕt'ăl-lûr-jў), the art of

economically extracting metals from ores, including smelting, reducing, refining, alloying, and kindred processes. The methods employed in extracting metals from ores differ somewhat. Various metals are found in a pure state. Such is the case with gold, silver, platinum, and many others, when they are said to be *virgin* or *native,* and are washed in troughs to separate them from other substances. This process was employed quite generally in early mining in California, Australia, and, Alaska, but in the larger mining enterprises the metals are found mostly in combination with various ores, such as chlorine, oxygen, sulphur, and others, and to secure the ores it is necessary to employ vast boring machinery and powerful explosives.

After being brought to the surface, the ores are taken to a crushing mill, where they are ground by large rollers into small particles, and afterward the different metallic substances are separated by machinery. In some localities the stamping mills are used instead of crushing rollers to reduce the ore to fine particles, which is usually the method of treating tin ores, as they need to be reduced to a fine powder. In stamping mills heavy pieces of iron are lifted to some height above the ores, which, in falling by their own weight, crush the substances like hammers. After the ore has been reduced to a state sufficiently fine, it is sifted on a jigging sieve to separate the finer portions that include the more valuable metals, and these portions are next washed in water. It is apparent that the heavier metals will sink more quickly than the lighter; thus, the more valuable form a layer at the bottom of the water, while the lighter and less valuable make up a layer at the top. The latter are raked off, while the lower and purer are ready for smelting, a process of calcination or roasting by which volatile constituents are expelled.

Gold and silver ores are sometimes treated by a process known as *amalgamation,* in which these metals are dissolved out by mercury and are afterward separated from the amalgam by distillation. In the *cyanide process,* which is used for low grade ores, the ores are crushed and treated by a solution of cyanogen and afterward the metals are secured by various processes. Lately *electrolysis* has been adopted extensively in metallurgy, the process of treating the ores being somewhat similar to the essentials of electrotyping. Various other methods are in use, depending upon the kind and character of the ores in which the metals are found.

METALS, the elementary substances that form a base by combining with oxygen, and which are distinguished by chemists from other elementary substances known as *metalloids,* or *nonmetals.* It is difficult to form a definition that embraces all the metals and excludes all nonmetallic substances, for the reason that the two classes approach each other by various characteristics in which the marks of distinction become peculiarly imperceptible. Chemists usually place fourteen elements in the list of nonmetallic substances. These include one liquid, five gases, and eight that form solids at ordinary temperatures, as follows: oxygen, hydrogen, nitrogen, sulphur, selenium, tellurium, phosphorus, chlorine, bromine, iodine, fluorine, carbon, boron, and silicon. However, hydrogen is considered a metal by some chemists, since it is chemically similar to the metals in its nature.

Among the principal characteristic properties of metals are opacity, metallic luster, solidity, except mercury at ordinary temperatures, insolubility in water, capability of forming salts when in a state of oxide, and the capacity of conducting heat and electricity. Many metals possess a ductility sufficient to admit them to be drawn out into wires, while some have a malleability that renders them capable of being rolled or beaten into thin sheets. Chemists usually regard 48 elements as metals, which they divide into the light and heavy classes, and according to this classification there are various subdivisions. The light metals are subdivided as follows: *true earth metals*—aluminum, cerium, didymium, erbium, glucinum, lanthanum, terbium, thorium, zirconium; *alkaline earth metals*—barium, calcium, magnesium, strontium; and *alkali metals*—caesium, lithium, potassium, rubidium, sodium. The following is a subdivision of the heavy metals: *metals whose oxide may be reduced by heat* —gold, iridium, mercury, osmium, platinum, palladium, rhodium, ruthenium, silver; *metals whose oxide forms weak bases*—arsenic, antimony, columbium or niobium, molybdenum, tantalum, titanium, tin, tungsten, vanadium; and *metals whose oxides form powerful bases*—bismuth, cadmium, cobalt, copper, chromium, iron, lead, manganese, nickel, thallium, uranium, zinc.

Besides the 48 named, there are several others regarded metals by some writers, but which have not been included. The ancients knew of only six metals, the list including gold, silver, copper, tin, iron, and lead, and their properties gave shape to the idea of a metal. Owing to the fluidity of mercury, it was not originally accepted as a metal, but, when it was found that it is hard and malleable in a frozen condition, its metallic property was admitted. In later times the isolation of the bases of the alkaline earths introduced among the metals elements that were not heavy, so that an exact scientific definition became impossible. Besides, several metals discovered in recent times exist in such small quantities that they are detected only by spectrum analysis, and it is quite likely that others will be added to the recognized list of metals. The different classes of metals unite with sulphur, oxygen, and chlorine, thus forming *sulphides, oxides,* and *chlorides.* Numerous combinations are possible wtih iodine, flourine, and bromine.

METAMORPHIC ROCKS (mĕt ă-môr'-

fĭk), a term applied in geology to rocks originally deposited in layers, but afterward so changed by the action of heat as to lose all traces of stratification. Metamorphism is caused by heat acting under pressure in the presence of moisture, and consists principally of a rearrangement in the chemical constituents of the rocks. Most of the metamorphic rocks are nonfossiliferous, but in some species all the traces of fossils have not been destroyed. They occur in various periods and consist principally of gneiss, schist, eurite, serpentine, quartz rock, clay slate, and crystalline limestone. Some of the metamorphic rocks have lost all traces of stratification, though others show evidences of having been formed by sedimentary deposits.

METAMORPHOSIS (mĕt-ȧ-môr'fô-sĭs), a transformation in the character, structure, form, or shape of anything. It is applied in entomology to the series of transformations which insects undergo in their process of development from the egg to full maturity. In zoölogy the term has reference to the changes that take place from the time that an animal is excluded from the ovum or egg until sexual maturity is attained. In chemistry it refers to the chemical action caused by the presence of a peculiar substance, as a ferment, resulting in the decomposition of a compound. In botany it is applied to the modification of one organ into another, as petals into stamens and stamens into pistils.

METAPHOR (mĕt'ȧ-fẽr), a figure of speech in which one object is likened to another. It is used for the purpose of implying that characteristics possessed by the one to which it properly belongs are possessed in at least some measure by the person or object to which it is applied. In the expression used by the Psalmist describing God's law as "a light to my feet and a lamp to my path," the use of metaphors is finely illustrated. The expressions "He was a lion in the fight" and "That man is a fox" take advantage of metaphor. In the expressions "He fought like a lion" and "That man is like a fox" similies are used, a simile differing from a metaphor in that a word of likeness is always expressed in the former.

METAPHYSICS (mĕt-ȧ-fĭz'ĭks), a term first applied by Aristotle to a group of philosophical dissertations of which the ultimate principles of being, the science of the first principles of knowing, and the knowledge of God, as the prime cause of all things, were made the basis. The term is now employed to designate the science which treats of subjects that are incapable of being dealt with by physical research. In this acceptation it embraces that branch of philosophy which deals with the conceptions or principles at the basis of all phenomena, including *being, substance, time, motion, space, reality, change, identity, difference, cause,* and many others. Metaphysics is now divided into general and special. *General metaphysics,* or *ontology,* relates to the science of being in general. *Special metaphysics,* or *pneumatology,* embraces natural theology; *rational cosmology,* the science of the origin and order of the world; and *rational psychology,* which treats of the nature, faculties, and laws of the human mind. See **Psychology.**

METCALF, Victor Howard, public man, born at Utica, N. Y., Oct. 10, 1853. He graduated at the Utica Free Academy and at the Yale Law School. In 1876 he was admitted to the bar. For some time he practiced his profession in his native city, but removed to California in 1881, where he was a member of the law firm of Metcalf and Metcalf. He served as a Republican in Congress for three terms, but resigned in 1894 to become Secretary of Commerce and Labor in the Cabinet of President Roosevelt.

METCHNIKOFF (mĕch'nĭ-kŏf), **Iliya,** embryologist, born in the province of Kharkov, Russia, May 15, 1845. He studied in his native city and subsequently took advanced courses in the universities of Giessen and Munich. In 1870 he became professor of zoölogy at Odessa, but resigned in 1882 to make private researches a direct object. The following year he published a treatise on the intracellular digestion of invertebrates, having special reference to polyps and sponges. In 1892 he was given an important position at the Pasteur Institute in Paris and in 1895 was made director of this institution, succeeding Pasteur at the time of his death. Besides contributing to scientific journals, he published "Examination of Intracellular Digestion of Invertebrates" and contributed to "Virchow's Archive of Pathological Anatomy and Physiology." He died July 15, 1916.

METEOR (mē'tē-ẽr), a small particle of matter that is thought to have its origin in disintegrated comets and moves around the sun in an orbit of its own. It is thought that there are many millions of meteors promiscuously distributed through space. They are variously known as shooting stars, aërolites, fireballs, meteoric stones, meteorolites, and falling stars. However, our knowledge of these bodies is confined to the relatively few which collide with the earth, or pass through the earth's atmosphere. When moving through space, their appearance is that of dark bodies, but, when coming in contact with the atmosphere, they become suddenly converted into heat by the friction resulting from passing swiftly through it. Generally the entire meteor is vaporized by the friction, the exterior being brushed off by the air as soon as melted, often leaving a visible train in the sky.

Meteors rarely appear more than 100 miles above the surface of the earth, and generally become dissipated before coming within 25 miles of the surface. It is certain that the speed with which they pass through space is controlled by the sun, for the reason that this speed is comparable with the speed of the earth round the

sun. It has been well established that meteors have regular orbits and that they originate from comets, this being demonstrated by groups of meteors that exist where formerly comets moved in fixed orbits. These meteors now travel in the same track, a fact especially true of Swift's comet, known since 1862, when it was established conclusively that meteors now occupy the orbit of that comet. Meteors consist of various known chemical elements. About one-third of all the elemental substances found in the earth's crust have been discovered, among them iron, sulphur, sodium, calcium, chlorine, carbon, and many others. Those that fall usually abound in stone, but in some instances there is a mixture of stone and iron, and in rare cases iron predominates. The fall of a meteor is accompanied by a peculiar noise as it passes through the air, and an explosion frequently results when it reaches the ground. At night and sometimes in daytime a long train of light is seen to follow its trail.

WILLAMETTE METEORITE.

The most remarkable meteor observed in recent times fell in Iowa on May 10, 1879, in the vicinity of Storm Lake, the heaviest stone weighing 437 pounds. A meteor found in Texas weighs 1,635 pounds and is now a part of the Yale collection. A meteor weighing 1,400 pounds, now at the United States National Museum, Washington, was found near Tucson, Ariz., and one in the Amherst collection, taken from Colorado, weighs 435 pounds. The famous Willamette Meteorite, now in the American Museum of Natural History, New York City, was found in Oregon. Remarkable meteors fell in Alsace in 1492, in Normandy in 1803, and in New York in 1860. Showers of meteors occur most frequently in August and November. The Leonides group of meteors, which is calculated to have a revolution around the sun every 33 years, is seen in November. It appeared with unusual brilliancy on November 13, 1833, and again in 1866, but in 1899 it was less brilliant. Many other groups of meteors exist, the most important being the Lyraids, that appear in April; the Pagasids and Perseids, in August; the Andromeds, in November; and the Orionids, in October and November. Astronomers have estimated the number of meteors that traverse the atmosphere daily, including only those that are large enough to be visible to the naked eye on a dark clear night, at no less than 7,500,000.

METEOROLOGY (mē-tē-ēr-ŏl'ō-gy), the science or department of natural philosophy that treats of the phenomena of the atmosphere. It relates especially to weather and climate, traces their relations to each other, and investigates the laws by which they are governed. This branch of study has come down from remote antiquity, but it did not take on its present extensive form and utility until the construction of telegraphic communication. Observations of weather and climate were made by the early Egyptians, whose general discoveries were gathered by Aristotle and published in connection with his own observations. Later Theophrastus, a pupil of Aristotle, classified many of the accepted signs that indicate stability or changes of weather and give evidence of approaching rain and storm. When such instruments as the thermometer, barometer, and hydrometer were invented, great strides of progress were made in meteorology, which, together with extensive explorations of the continents and oceans, facilitated the publication of observations that soon reduced the study to a science. When printing was invented, reports of the climatic conditions of different countries began to be published, and with the construction of telegraphic and telephonic communication it became possible to communicate impending changes of weather and climatic conditions to remote localities, thus furnishing security against many of the damaging effects of tornadoes on land and sea.

Societies for the investigation of laws that regulate meteorological variations were formed in the early part of the last century, and toward the latter half of that century many of the leading governments began to establish public observatories. Since all the climatic phenomena are due to the action of the sun, but are variously affected by the altitude, size of land masses, proximity to the sea, winds, and character of the soil, it has been the purpose to make observations in relation to the various characteristics of weather and climate in different localities at the same time, and to make a record of variations at different times in the same locality. The former serve to secure intelligence regarding changes in the weather generally, while the latter aids in obtaining knowledge of the mean average rainfall and temperature of particular places. Many countries have taken special means to study the direction, locality, and probability of winds and to place the results, together with other valuable observations, on tabulated weather charts and meteorological maps. Such charts and maps are generally dis-

tributed by the government and are posted daily in public places.

Benjamin Franklin was among the first to make careful observations of meteorological phenomena in America. He was one of the earliest to call attention to the fact that storms of the northern states come largely from a westerly direction. Thomas Jefferson began taking observations at different points in 1772, for which purpose he established several stations, the two most important being at Monticello and Williamsburg, Va. Prior to that observations were made in particular localities, but Franklin led the way in making simultaneous investigations. However, the results were not communicated extensively until after the telegraph was invented. The United States Weather Bureau was originated in 1870 and in 1891 was placed under the direction of the Department of Agriculture. This bureau publishes forecasts of the weather twice daily, and causes them to be telegraphed to the various stations at which signals are displayed for the benefit of the public. It issues annually weather maps and numerous publications of a varied character. The forecasts made of the weather usually extend from 20 to 36 hours in advance. Canada and Newfoundland likewise have an efficient meteorological service. Observing stations are maintained at numerous points in all the provinces and in Yukon.

METER. See **Metre.**

METHANE (mĕth'ān), or **Marsh Gas,** the name of a gas resulting from the decay of vegetable matter under water. It is found in the stagnant water of marshes, in many coal mines, and in petroleum wells. This gas is colorless and odorless and when lighted burns with a bluish flame. Explosions of methane in coal banks is dangerous to the workmen. A similar gas in such places is called fire damp. See **Fire Damp.**

METHODIST (mĕth'ŏ-dĭst), one of the largest branches of the Protestant Church. It was organized about 1727 at Oxford, England, under the leadership of George Whitefield and John and Charles Wesley. Originally John Wesley called those who constituted the church the *United Society,* but students of Oxford originated the name *Methodist* in reference to the strict and methodical teaching of Charles Wesley. The denomination became independent of the Church of England in 1784, but even before that time promoted missionary work. The first society of the Methodist Church in North America was founded in New York City in 1766 and the first conference was held in Philadelphia in 1773, when 1,106 members attended for general deliberation. At a conference in Baltimore, in 1784, the main body formally adopted the name *Methodist Episcopal Church.*

Methodism is at present classified into seventeen denominations. The statistics of 1922 place the total membership of the world at over 18,500,000. While the communicants are widely distributed in the grand divisions, they are most numerous in the English-speaking countries. Among the organizations to promote religious influence are the Board of Education, the Epworth League, the Woman's Home and Foreign Missionary societies, the Sunday School Union, and the Board of Church Extension. Many periodicals, institutions of learning, and thoroughly organized forces of missionaries are maintained. In 1922 there were 1,079,892 Methodists in Canada and they had 3,850 churches. The United States in the same year had 7,500,000, of which about half belonged to the Methodist Episcopal Church. The Methodist denominations of the United States are the most numerous among the Protestants. In 1922 the total membership was reported at 6,875,500, when they had 43,000 ministers and 63,500 churches. This total included 3,850,000 members of the Methodist Episcopal Church, which is the strongest body, and 2,150,000 communicants of the Methodist Episcopal Church, South. In the same year the Methodist Protestant Church had 190,000 communicants. Other denominations include the Free Methodists, the Primitive Methodists, the African Methodists, the Wesleyan Methodists, and the Congregational Methodists.

METHUEN (mē-thū'ĕn), a town of Massachusetts, in Essex County, two miles northwest of Lawrence. It is on the Spicket River and on the Boston and Maine Railroad. It has the Nevins Memorial Library and a number of fine schools and churches. The manufactures include boots and shoes, cotton and woolen goods, machinery, cordage, and hats. An electric railway system connects it with neighboring cities. Methuen was settled in 1641 and incorporated as a town in 1725. Population, 1925, 20,606.

METHUEN (mę-thōō'ĕn), **Paul Sanford,** general, born at Corsham Court, England, Sept. 1, 1845. He studied at Eton and became lieutenant of the Scots Guards in 1864. Subsequently he served in Western Africa against the Ashantees, was connected four years with the diplomatic service in Berlin, and in 1881 became assistant quartermaster general for the home district. He was transferred to Egypt in 1882 and was quartermaster general in Bechuanaland in 1884. In the beginning of the war against the Boers he was sent with a division of Buller's army to relieve Kimberley, but was wounded at the Modder River, and on Nov. 30, 1899, was defeated at Magersfontein with a loss of about 1,000 men. In June, 1900, he operated with Lord Roberts against Pretoria and in March, 1902, was captured near Lichtenburg by a detachment of the Boers under General De la Rey.

METHYL ALCOHOL (mĕth'ĕl). See **Alcohol.**

METONIC CYCLE (mē-tŏn'ĭk sī'k'l), a cycle of nineteen years invented by Meton, a Greek astronomer, who flourished at Athens

about 432 B. C. The year of this cycle consists of 235 lunar months, or 6,940 days, after which space of time the new moon occurs on the same day of the year on which it occurred at the beginning of the cycle. The eclipses may be reckoned in about the same order. Time was reckoned by the Greeks in lunar months, the year consisting of 354 days, 8 hours, 48 minutes, and 33.3 seconds, and upon this system of calculation depended the recurrence of many religious festivals and rites. However, some of the rites were fixed upon the recurrence of the seasons, hence they sought to bring their year in accord with the solar year, which consists of 365 days, 5 hours, 48 minutes, and 46 seconds. Certain inaccuracies in their calculations were afterward corrected by Callippus in the 4th century B. C. The *golden number,* which is indicated in most of the modern almanacs, is the number of any year in the cycle. In the Gregorian calendar the golden number of any year is reckoned from 1 B. C., since a new moon occurred in January 1 of that year. The golden number of any year may be found by adding one to the year and dividing the sum by 19, the remainder being the golden number. If the year plus 1 is divisible by 19 without a remainder, the year is the last of a cycle and the golden number is 19. Thus, 10 was the golden number of 1909.

METONOMY (mĕ-tŏn'ĭ-mў), the exchange of names between things related. It is a figure of speech, consisting in the naming of a thing by one of its attributes, as substituting the material for the thing made, or the inventor for the thing invented. For example, we say a man keeps a good table, or we have read Virgil, meaning in the first case that the food is good and in the second that we have read the writings of Virgil.

METRE (mē'tĕr), or **Meter,** a term used in prosody to designate the succession of certain groups of syllables. The metre in classic languages depended upon the way in which long and short syllables succeeded one another, but in English the metre depends upon the arrangement of accented and unaccented syllables. In each metre there is one accented syllable and one or two unaccented. Metre is also a name applied to a metrical measure of length, which equals 3.28 feet, or 39.37 inches.

METRIC SYSTEM (mĕt'rĭk), a system of measurement adopted in France by a convention in 1795. It bases all measures of capacity, weight, length, and area upon the value of a quadrant of the meridian measured between the Equator and the poles. The system is a great improvement over all other systems for the reason that it is purely decimal. It has been adopted in many of the European countries for all purposes of measurement, and obtains in the coinage and money systems of the United States and Canada. Though rarely used in ordinary business transactions in the United States, it is employed extensively by government officials and scientific men. The *meter* is the standard of the metric system, which was supposed to be one ten-millionth of the distance from the Equator to the Pole, measured on the earth's surface at the sea level. It is 39.37 inches long. The *liter* is the unit of measures of capacity, both for solids and liquids, and equals the cube of one-tenth of a meter, or 61.027 cubic inches, or 1.76 pints. The *gram* is the unit of weight. It is equivalent to about 15½ grains troy weight, and equals the weight of a cubic centimeter of distilled water at a temperature of about 39° Fahr. The following are the tables:

LONG OR LINEAR MEASURE.

10 millimeters (mm)	=1 centimeter (cm)
10 centimeters	=1 decimeter (dm)
10 decimeters	=1 meter (m)
10 meters	=1 decameter (Dm)
10 decameters	=1 hectometer (Hm)
10 hectometers	=1 kilometer (Km)
10 kilometers	=1 myriameter (Mm)

MEASURES OF CAPACITY.

10 milliliters (ml)	=1 centiliter (cl)
10 centiliters	=1 deciliter (dl)
10 deciliters	=1 liter (l)
10 liters	=1 decaliter (Dl)
10 decaliters	=1 hectoliters (Hl)
10 hectoliters	=1 kiloliter (Kl)

MEASURES OF WEIGHT.

10 milligrams (mg)	=1 centigram (cg)
10 centigrams	=1 decigram (dg)
10 decigrams	=1 gram (g)
10 grams	=1 decagram (Dg)
10 decagrams	=1 hectogram (Hg)
10 hectograms	=1 kilogram (Kg)

METRONOME (mĕt'rō-nōm), an instrument for denoting the speed at which a musical composition is to be performed. It consists of a pendulum swung on a pivot, below which is a fixed weight and above it is a sliding weight that regulates the velocity of the oscillation by the greater or less distance from the pivot on which it is adjusted. The motion is obtained by clockwork in most instruments, but some are impelled by the touch. The invention of this instrument is ascribed to Johann Maelzel (1772-1838), a native of Ratisbon, Germany.

METTERNICH (mĕt'tĕr-nĭk), **Clemens Wenzel Lother, Prince von,** Austrian statesman, born in Coblentz, Germany, May 15, 1773; died at Vienna, June 11, 1859. He descended from a distinguished family, was educated at the University of Strassburg, and later completed a law course at Mentz. In 1798 he attended a congress at Rastadt, where he represented the German princes, and in 1801 became ambassador at Dresden, but was transferred to Berlin two years later under an appointment from Austria. In 1806 he was appointed ambassador to Paris, concluded the Treaty of Fontainebleau in 1807, and, when the War of 1809 between France and Austria began, he became minister of foreign affairs, guiding the course of Austria through the difficulties from 1809 until 1813. His first acts included a treaty of peace with France in 1809 and the negotiation of the marriage between Napoleon and Maria Louisa of Austria. After the French forces were reversed

in Austria in 1813, Metternich led the movement that induced Austria to declare war against France, and subsequently concluded the Quadruple Alliance. In the same year the Emperor of Austria created him a prince. In 1815 he signed the second Treaty of Paris as Austrian plenipotentiary. He was made chancellor in 1821 and continued to direct in a large measure the policy of European powers until in 1848, when he was compelled to flee by the revolutionary movement. England was his place of refuge, where he remained until 1851, when he returned to Vienna and was shown marked honors by the emperor. He continued to exercise much influence in European affairs until his death.

METZ (mĕts), a fortified city in France, at the confluence of the Seille and the Moselle, in the imperial territory of Alsace-Lorraine. It is partly on islands in the two rivers and on several railroad and electric railway lines. The noteworthy buildings include the Church of Saint Vincent, the Gothic cathedral, the Church of Saint Constance, the palace of justice, the post office, and the central railway station. Among the manufactures are leather, cottons, hosiery, clothing, silk and woolen goods, musical instruments, machinery, toys, and earthenware. Metz was known as an important town during the Roman occupation, became a part of Germany by the division of Charlemagne's empire, and in 1552 was captured by the French. In the Franco-German War of 1870-71 it formed the principal stronghold of France on the northeastern boundary. It was held by a large military force under Bazaine, but was captured on Oct. 27, 1870, after a siege of the German army, when 180,000 men became prisoners of war. Since the annexation of Lorraine to Germany, Metz has been greatly strengthened as a fortified city. In 1919 it was annexed to France by the Paris Peace Congress. Population, 1905, 60,419; in 1920, 68,667.

MEUSE (mūz), a river of Europe. It rises in the Côte d'Or Mountains of France, thence flows northward through Belgium, and, after entering the Netherlands, it becomes known as the Maas River. The entire course is 565 miles, of which 430 miles are navigable, or to Verdun. It enters the North Sea by several mouths. Many thriving cities are on the river, including Rotterdam, Liege, and Sedan.

MEXICAN WAR, the war between Mexico and the United States, which extended from April, 1846, to September, 1847. Texas had seceded from Mexico and applied for annexation to the United States, which naturally caused the Mexicans to become apprehensive, but the desire of the proslavery party to extend the slavery territory in the United States had much to do with the creation of a hostile feeling between the two countries. In 1837 the United States recognized Texas as an independent government and it was annexed in 1845, which gave rise to a dispute concerning the boundary between Texas and Mexico. Texas, as a state of Mexico, had been bounded on the south by the Nueces River, but claimed the Rio Grande as the southwestern boundary. When James K. Polk became President, in 1845, he favored the Rio Grande as the natural boundary between the two countries and directed that General Taylor proceed to occupy the disputed territory with a force of 3,000 Americans. In the spring of 1846, in obedience to further orders, he advanced to the Rio Grande. An engagement occurred between United States troops and a force of Mexicans on April 23, 1846, in which the former were defeated and a part of the force was captured. A message was promptly sent to Congress by President Polk, in which he declared that Mexico had invaded the territory of the United States. To this Congress at once responded that "by the act of the Republic of Mexico a state of war exists," and authorized the President to call for 50,000 volunteers. This bill passed both branches of Congress by an almost unanimous vote, and that body authorized the expenditure of $10,000,000 for the prosecution of the war.

General Kearny marched into New Mexico and conquered the entire region, over which he raised the United States flag. He sent Colonel Doniphan to take possession of Chihuahua, while he himself proceeded to California, which was speedily conquered with the aid of Lieutenant Frémont. In the meantime General Taylor entered upon a plan to invade Mexico. The first important battle of the war occurred on May 8, 1846, at Palo Alto, where 2,300 Americans under General Taylor defeated 6,000 Mexicans under General Arista. The Mexicans retreated to Resaca de la Palma, where they were defeated the following day, and they retired in confusion to Matamoros, many drowning in crossing the Rio Grande. General Arista evacuated Matamoros May 17th and Taylor crossed the river and occupied that place the following day. In September he marched against the Mexicans at Monterey, where the latter had taken a strong position, but the place was captured on September 24, after a siege of three days.

A large part of Taylor's army was placed under command of General Scott, while the former retained his headquarters at Monterey. General Santa Anna, having learned of the condition of Taylor's army, decided to operate against him with 20,000 men. He took a position near Saltillo and on Feb. 22, 1847, began the Battle of Buena Vista. The Mexicans, though having a vastly superior number, were defeated after an engagement lasting two days. In the meantime Scott proceeded against Vera Cruz, where he landed an army early in March, and the city was captured on March 29, 1847. Scott soon after left Vera Cruz to march against the City of Mexico. At Cerro Gordo, a distance of sixty miles from Vera Cruz, he was met by

12,000 Mexicans under Santa Anna, but they were defeated with a loss of 1,000 men and 3,000 prisoners. The Americans won successes in rapid succession at Puebla, Contreras, San Antonio, and Churubusco. The final movement to capture the City of Mexico began early in September. Molino del Rey was captured in a hand to hand fight on September 8 and the castle of Chapultepec was stormed and captured on the 13th. The Mexicans evacuated the City of Mexico on the 14th and General Scott at once took possession of the capital, where he established his headquarters.

The Mexican War is usually looked upon as one of unjust aggression on a minor power, with the object of winning more territory. It ended by the Treaty of Guadalupe Hidalgo, which was signed Feb. 2, 1848. It provided that the government of the United States assume the payment of $3,250,000 debts due from Mexico to citizens of the United States and that the sum of $11,000,000 be paid for the territory ceded. This cession of territory included what now comprises California and the portion of Arizona and New Mexico not included in the Gadsden Purchase.

MEXICO (měks'ĭ-kō), a city of Missouri, county seat of Audrain County, 105 miles northwest of Saint Louis. It is on the Wabash, the Chicago and Alton, and the Chicago, Burlington and Quincy railroads, and is surrounded by a productive farming and dairying country. Among the chief buildings are the Missouri Military Academy, the Hardin College for Women, the high school, and a number of county buildings. The manufactures include flour, brick, bread, machinery, and earthenware. It has systems of sanitary sewerage and waterworks. Mexico was settled in 1833 and incorporated in 1852. Population, 1920, 6,013.

MEXICO, the capital and largest city of Mexico, in a beautiful valley about 7,350 feet above sea level, in the south central portion of the country. It is located in the Federal District, a tract of 463 square miles, but the area of the corporation is about 22 square miles. Surrounding the city are a number of hills and in its vicinity are several lakes, of which Lake Texcoco is the most important. It is regularly platted, has well graded and paved streets, and is beautified by avenues of trees and public parks. Substantially paved highways and interurban electric railways extend many miles into the country. Several railroad lines connect the city with all parts of the country and with portions of the United States and Central America. It has a fine system of public waterworks, gas and electric lighting, street railways, public schools, colleges, and a central university.

The architecture differs from that of most large cities of America in that it is not as high, which is accounted for by the occurrence of earthquakes at various times. In the center of the city is a magnificent cathedral, founded in 1573, which is 426 feet long and was built at a cost of $2,500,000. The national capitol, on the east side of the Plaza de Armas, is 675 feet long and contains the government offices. The National Museum of Natural History and Antiquities has a valuable collection of Aztec relics. Other buildings include the city hall, the Church of the Jesuits, the national library of 225,000 volumes, the Mexican School of Mines, the Iturbide Hotel, the post office, and many schools and hospitals.

Mexico ranks as the most important commercial city of Latin North America. It has a large wholesale and jobbing trade and contains many railroad shops, cotton and woolen mills, brick and tile yards, banks and commercial associations, and meat curing and packing establishments. Among the general manufactures are cigars, jewelry, machinery, carriages, fabrics, laces, spirituous liquors, and earthenware.

Mexico is situated on the site of Tenochtitlan, an ancient city of the Aztecs, which was founded by them in 1325. It was the capital of the Montezumas and was captured by the Spanish under Cortez in 1521. The ancient city possessed vast wealth and much beauty at the time of the conquest, but was destroyed, and Mexico was founded in its place with the assistance of a large force of natives. For about 300 years it was one of the most noted cities of imperial Spain, became the capital of Emperor Maximilian, and has been the seat of the republic since its establishment. The inhabitants are mostly native Mexicans, but include many French, Germans, English, and Spaniards. Population, 1920, 570,659.

MEXICO, a republic of North America, located between Central America and the United States. It is bounded on the north by the United States and the Gulf of Mexico, east by the Gulf of Mexico, the Caribbean Sea, and British Honduras, south by Guatemala and the Pacific Ocean, and west by the Pacific Ocean. The length from north to south is about 2,000 miles, the breadth is from 125 to 1,600 miles, and the area is 767,316 square miles. Its boundary with the United States has a length of 1,833 miles, a large part of which is formed by the Rio Grande. The narrowest point is between the Gulf of Campeche and the Gulf of Tehuantepec, east and north of which is the peninsula of Yucatan. In the western part, west of the Colorado River and the Gulf of California, is the peninsula of Lower California. The Tropic of Cancer divides it into almost equal portions, thus placing it partly in the North Temperate and partly in the Torrid Zone. It has a coast line of about 6,000 miles, including 4,574 miles on the Pacific Ocean. A number of small but fertile islands lie off the coast, including Cozumel Island in the Caribbean, Island de Cedros in the Pacific, and Angel de la Guarda in the Gulf of California.

DESCRIPTION. The greater portion of the sur-

face is an elevated tableland, much of which is fully 8,000 feet above sea level. It slopes quite abruptly toward the Gulf of Mexico, except in the broad depression of the Rio Grande, and somewhat less steeply toward the Pacific. The mountains are a continuation of the Cordilleras of North America and include ranges known as the Sierra Madre, Sierra Madre del Sur, Sierra de Tarahumare, and Sierra de Navarit. The ranges trend almost uniformly from southeast toward the northwest and include a number of lofty peaks and volcanoes, though most of the latter are dormant or entirely extinct. Orizaba, the highest peak, has an elevation of 18,250 feet, and is situated on a line drawn between Vera Cruz and the City of Mexico. Popocatepetl, 17,784 feet, is an active volcano with a crater 250 feet deep. Other vast elevations include Ixtaccihuatl, 16,950 feet; Nevado de Toluca, 14,945 feet; Malinche, 13,450 feet; Cofre de Perote, 13,400 feet; Colima, 12,970 feet; and Jorullo, 4,330 feet. Many of the peaks extend above the snow line, which is about 15,000 feet high, hence they give rise to numerous glaciers and rapid-flowing mountain streams. Jorullo, though not greatly elevated, is noted as an active volcano and is said to have risen above the surface during an eruption in 1759. The mountains enumerated are located in the southern part of the country, but elevated ridges trend northward and a range of mountains traverses Lower California. A large part of the interior, though highly elevated, has a level surface.

The Rio Grande, which forms the boundary between the United States and Mexico, is the most important river. Within the country it receives few tributaries, the only one of note being the Rio Conchos, which enters the Rio Grande at Presidio del Norte. The Rio Salado, whose waters are made saline by their slow passage through shallow basins, joins the Rio Grande at Guerrero. In the eastern part is the Rio Pánuco, which flows into the Gulf of Mexico at Tampico. The Usumacinta enters the country from Guatemala, having its source in Lake Petén, and flows northward into the Gulf of Campeche. Among the rivers of the western section are the del Altar, the Sonora, the Yaqui, and the Mayo, flowing into the Gulf of California, and the Rio de las Balsas and the Larma, or Santiago, flowing into the Pacific. In the course of the last mentioned, about fifteen miles from Guadalajara, are the beautiful Falls of Juanacatlan. The country has many small lakes, but few are of importance. Lake Chapala, located chiefly in the state of Jalisco, is the largest inland body of water. It discharges through the Larma River.

The climate is greatly diversified in different sections and as a whole it is warm and healthful. Along the coast the climate is hot, farther inland it is temperate and equable, and the higher elevations are somewhat cold. The regions lying from 3,000 to 6,000 feet above sea level are the most healthful, while the lower coast plains are quite unhealthful, though systematic drainage of the swamps has improved the conditions materially. The mean annual temperature along the coast is about 80°, but the temperature frequently rises to 100°, and in some places, as at the port of La Paz, the thermometer rises to 104°. In the moderately elevated sections the annual temperature ranges from 60° to 70° and in the higher altitudes, from 50° to 60°. A large portion of the interior has a scant rainfall, ranging from 18 to 25 inches, while in some sections of the coast lands it is 125 inches. At the City of Mexico the mean rainfall is 30 inches per year. Though subject to earthquakes, comparatively little damage is done by these disturbances.

Flora and Fauna. The vegetation differs greatly according to climatic influences. In traveling a few hours it is possible to observe great differences in the growth and classes of plant life. Those riding on trains in some sections may observe the wheat just coming above the ground, while in others the fields are ripening, and in the lower lands the grain is being threshed. Many varieties of trees abound, though some of the mountains have been cut over to supply material for fuel and timber for the mines. The lowlands have fine forests of mahogany, rose wood, gum trees, palms, and oil-bearing trees. In the higher altitudes are oaks, pines, and firs.

The mountains are frequented by many wild animals, such as the puma, bear, ocelot, jaguar, and peccary. The tropical forests have many species of monkeys and the sloth. Squirrels, hares, otters, deer, and beavers are widely distributed, and the rattle and coral snakes are well represented. The birds native to Mexico include vultures, parrots, humming birds, turkeys, and many songsters native to the warmer climates.

Mining. Mexico is one of the richest mining countries of the world, though the fields have not been developed to the extent of their possibility. Iron deposits of great value are found in Durango, Michoacan, and Jalisco. It is estimated that the famous Cerro del Mercado, a hill of magnetic iron ore, 1,100 feet wide, 4,800 feet long, and 650 feet high, contains 300.000,000 tons of ore above the general surface of the district, but the deposits likewise extend below the plain. Deposits of silver and native copper abound in the vicinity of the city of Guanajuato. Gold is found principally on the slope toward the Pacific. In 1922 about 1,200 mines were in operation, with an output of ore valued at $125,000,000. The annual output of silver is $75,500,000 and gold $20,000,000. Coal occurs in veins ranging from four to sixteen feet in thickness, including both bituminous and an excellent grade of anthracite, but the production has not been materially large, owing to inadequate railroad facilities. Formerly the supply of coal was

imported largely from England and the United States, but the fields of Sonora, Oaxaca, and Michoacan now yield a large output. Petroleum and natural gas are obtained in large quantities. Building stone, such as granite and limestone, are very abundant. Other minerals worked more or less extensively include salt, copper, lead, cobalt, sulphur, and quicksilver.

AGRICULTURE. Few countries are equally well adapted to the growth of valuable plants. Coffee is grown extensively for exportation and both yield and quality take high rank. Cotton is an important crop in the states bordering on the Pacific and the Gulf of Mexico, but the quantity produced is consumed largely by the local mills. This is true to about the same extent of sugar, which is made from cane grown chiefly in the lowlands of the southern part. Wheat is the most important of the cereals, being cultivated in nearly all parts of the country, and the cultivation of corn is carried on throughout the temperate region. Other crops include rice, tobacco, barley, beans, and many varieties of tropical fruits. Dye plants and aloes are grown profitably.

Stock raising is one of the important industries, especially in the savannahs of Vera Cruz and Tabasco, where cattle are reared and fattened by feeding on nutritious grasses. The ranches are known as *haciendas,* at which large herds are in charge of herders known as *vaqueros.* However, the cattle are rather inferior in quality, being of the long-horn type. Considerable interests are vested in rearing sheep, both for the wool and for mutton. The horses grown are quite hardy but of small size. Steers are used to some extent as animals of draft, but they are being displaced by horses and mules. Poultry is grown profitably in all sections of the country.

MANUFACTURES. Recent years have witnessed a noticeable improvement in the volume and class of manufactures, especially textiles, cigars, and machinery. Cotton manufacturing was not introduced until 1834, but at present a large number of cotton spinning and weaving mills are operated, many of which are propelled by water power. Sugar is one of the important manufactures, but the output does not materially exceed home consumption. Many tobacco factories are operated, producing snuff, cigars, and pipe tobacco. The national beverage of Mexico, known as *pulque,* is produced in large quantities from a species of the agave. Other manufactures include carpets, flour, drugs, leather, embroidery, feather work, clothing, beer, and whisky. Home industries are encouraged by the government through a protective tariff system, nearly all imported goods being taxed according to their value.

TRANSPORTATION AND COMMERCE. The first railroad was built in 1854 from Guadalupe to the City of Mexico, a distance of three miles. The construction of railroads has been rapid since 1870 and important trunk lines are now operated in most sections of the country. The total lines aggregate 15,750 miles. Three lines connect the principal trade centers with points in the United States, and a line crosses the narrow strip of land lying between the Gulf of Campeche (Mexico) and the Gulf of Tehuantepec. Electric railways are operated in many of the cities and through some of the more densely populated rural districts. The country has 2,500 post offices, 30,500 miles of telephone lines, and 46,500 miles of telegraph lines. An extensive coast facilitates communications by water, but few of the rivers are navigable, including only the Colorado and the Rio de las Balsas.

The commerce of Mexico is increasing rapidly and the exports somewhat exceed the imports. Foreign trade, in the order of importance, is with the United States, Great Britain, Germany, France, and Spain. The leading commodities exported are silver, gold, coffee, woods, copper, hides, tobacco, and fruits, and the chief imports embrace coal, machinery, and manufactured articles. The annual imports aggregate $178,500,000 and the exports, $203,273,000. The United States is the chief market for the products of Mexico, and is likewise the source from which the greater part of its foreign supplies are obtained.

EDUCATION. All the states maintain a system of public schools at which attendance is free and compulsory, but the school attendance laws are not strictly enforced. More than half of the people are unable to read and write. Educational advancement is confined largely to the whites and those of mixed bloods, while illiteracy prevails generally among the Indians. About one-half of the schools are managed by the federal and state governments, and the remainder are either maintained by the municipalities or by religious bodies. Special schools of law, medicine, engineering, and the practical industries are supported by the government. About 750 newspapers, including dailies and weeklies, are published. The country has 175 public libraries, including the national library at the City of Mexico, which contains 225,000 volumes. In literary and scientific advancement the people of Mexico occupy the first stage in the Spanish-speaking countries of America and a number of their authors, painters, and sculptors have produced works of high rank.

The religion is largely Roman Catholic, but since 1857 there has been absolute religious freedom for all classes and the church is divorced entirely from the state. The total number of churches is placed at 10,375, which includes about 200 Protestant places of worship. A large number of missions and religious schools are maintained. The larger number of Indians still hold to pagan worship, though Christianity has been adopted by many.

GOVERNMENT. Mexico is divided into twenty-seven states, three territories, and the federal district comprising the capital of the republic, to which is joined a small adjacent territory. It is governed under a constitution that dates from 1917, which is modeled after that of the United States. The president is chosen indirectly by the electors for a term of four years and is eligible to reëlection from time to time. In case there is a vacancy in the presidency, it devolves upon congress to choose an acting president. The chief executive is assisted by a cabinet of seven secretaries, who are at the heads of the departments of the interior, foreign affairs, colonization and industry, justice and public instruction, finance and public credit, communication and public works, and war and marine. The legislative power is vested in a congress constituted of a senate and a house of representatives. Members in both branches are chosen by indirect ballot, the representatives for two and the senators for four years. Half of the senators are elected every two years, the representation in the senate being by two senators from the federal district and from each of the states. The judicial power is vested in circuit and district courts, which are subordinate to the supreme court of the nation. Each state has its own legislature, courts of justice, and a resident governor.

INHABITANTS. The inhabitants consist principally of descendants from early Spanish settlers and Indians. Spanish is the official and spoken language, but a number of different dialects are used. Many branches of business are monopolized by foreigners, principally by the English, Germans, and French. Immigration is encouraged by the government, under which a large number of agricultural colonies have been established. Mexico, the capital and largest city, is located in the south central part. Other cities include Puebla, León, Vera Cruz, Guadalajara, San Luis Potosi, Monterey, Pachuca, Durango, Zacatecas, Mérida, Querétaro, Oaxaca, Morelia, Aguascalientes, Toluca, Colima, and Jalapa. Population, 1920, 15,563,207.

HISTORY. Much of the early history of Mexico has been gathered from tradition and the hieroglyphics found on its monuments. According to the best authorities its early history is divided into the two periods of the Toltecs and Aztecs. The Toltecs are thought to have occupied a large region in the center of Mexico, extending from the Gulf of Mexico to the Pacific Ocean. They not only possessed a knowledge of agriculture, but constructed highways, founded cities, built temples, and erected monuments and pyramids, many of which have thrown much light upon their customs and industries. In about the 11th century they occupied Yucatan and portions of Central America, and by the early part of the 13th century the Aztecs moved southward and into the regions of the City of Mexico, on whose site they founded the ancient city of Tenochtitlan in 1325. It is thought that the Aztecs were constituted largely of a mixture of Toltecs and of other North American Indians, and it is certain that they possessed less advancement in civilized arts than the earlier occupants of Mexico.

In 1519 Cortez landed with a force of Spaniards in the region now occupied by Vera Cruz and two years later the country was conquered, when Cortez named it New Spain. He officiated as the captain general until in 1535. The method of Spain, like that of most countries pursuing policies of foreign conquest, was directed with a view of utilizing the natives as slaves in the development of mines and plantations and to monopolize its trade. Under this policy Mexico remained oppressed for more than 300 years, or until 1821, when the last of 57 imperial viceroys was compelled to surrender Spanish authority. The rebellion properly started in 1808, while Spain and France were at war, the Mexicans thus profiting by complications in the mother country. A chief of the insurgents, General Iturbide, became emperor on May 18, 1822, assuming the title of Augustine I., but the republican forces under Gen. Santa Anna remained active and forced the emperor to abdicate in 1823. He was shot after attempting to recover his possessions the following year.

Interior complications continued to disturb Mexican politics for some years. In 1836 Texas was separated by declaring its independence, and, after forming a republic, was admitted to the United States in 1845. The following year a war began with the United States on account of a boundary dispute, but Mexico lost in every battle, and in 1848 concluded peace by ceding about 500,000 square miles of territory. After the war with the United States, the government was represented largely by Santa Anna until in 1861, when General Juarez became its president. Soon after the country became involved in a war with France, Spain, and England, which countries sent allied troops to Mexico for the purpose of opening a way for internal improvements, and to invalidate the confiscation of church property and the separation of church and state, which had been made by General Juarez. The difficulties were first terminated by a treaty of peace with Spain and England, but France dissented and took possession of the City of Mexico by a military force in 1863. Archduke Maximilian of Austria was induced by Napoleon III. to become emperor of Mexico, a course against which the United States government remonstrated. However, General Juarez defeated the imperial forces. Maximilian was taken a prisoner and shot in 1867. General Juarez was elected president of the newly formed republic, a position he held until his death in 1872. He was succeeded by General Tejada, but in 1876 a revolution brought General Diaz into the presidential office. He administered the government with eminent ability, and in 1880 was

succeeded in the office of president by Manuel Gonzalez. Diaz was again elected president in 1884, and on account of his vigorous and popular administration was reëlected in 1888, 1892, 1896, 1900, and 1906. Diaz resigned on account of a revolution in 1911 and was succeeded by Francisco de la Barra, who served as provisional president until October, when Francisco I. Madero was elected president. The followers of Victoriano Huerto (died in 1916) shot Madero in 1913, after which Huerto officiated as president, but was not recognized by the foreign nations. In 1915 the United States recognized Venustiano Carranza as president. He was slain during a rebellion in 1920 and was succeeded by Adolfo de la Huerta. Alvaro Obregon was elected president in 1920, serving until 1924, when he was succeeded by Plutarco Calles. Alvaro Obregon was again elected president in 1928, but was assassinated in that year before taking office.

MEXICO, Gulf of, the most important inlet from the Atlantic Ocean in North America, situated south of the United States and east of Mexico. It has an area of 716,200 square miles. The general shape is circular. The greatest length from southwest to northeast is about 1,115 miles. At its entrance from Florida to Yucatan it is about 500 miles wide, and midway between the two points is the western extremity of Cuba. Within the gulf are a number of small islands. The coastal lands are quite low. Among the principal rivers that flow into it are the Mississippi, Rio Grande, Colorado, Brazos, Apalachicola, Mobile, and Usumacinta. The Gulf Stream enters it through Yucatan Channel and passes out through the Straits of Florida.

MEYER (mī'ĕr), **George von Lengerke,** public man, born in Boston, Mass., June 24, 1858; died Mar. 9, 1918. He studied at Harvard and in 1889 became a member of the Republican national committee, and the following year was appointed by President McKinley as ambassador to Italy. He was transferred to Russia in 1905, became Postmaster-General in 1906, and later was Secretary of the Navy.

MEYERBEER (mī'ĕr-bār), **Giacomo,** musical composer, born in Berlin, Germany, Sept. 5, 1791; died in Paris, France, May 2, 1864. His natural ability for musical arts made itself manifest very early, being able to play on the piano at five years. At seven years he gave an exhibition of his musical skill in public by playing from Mozart. He took musical training under master musicians in Berlin and Darmstadt, and later studied the new Italian music of Rossini. His cantata "God and Nature" was written while he was at Darmstadt. In 1812 he wrote "Jephthah" at Munich, and, after studying in Italy, he began to compose in a new style that even surpassed the productions of Rossini. His compositions became highly popular and when he appeared at Paris, in 1830, the enthusiasm accorded him was the most expressive ever witnessed in that city. Later he appeared with equal success in the principal cities of Germany, Austria, Italy, England, Russia, and other countries. Meyerbeer was not only an excellent musician and artist, but gave many celebrated cantatas, compositions, and songs to the musical world, many of which are still popular in Europe and America. Among the best known are "Robert le Diable," "Huguenots," "Prophet," "Two Caliphs," "Star of the North," "Dinorah," and his last work, entitled "L'Africaine."

MEYERHEIM (mī'ĕr-hīm), **Paul,** painter, born in Berlin, Germany, in 1842. He first studied under his father, Friedrich Eduard Meyerheim (1808-1879), and afterward at the Berlin Academy. His productions include "Four Seasons," "Sheep-Shearing," "Monkeys in a Studio," "Wild Man's Tent," and "Charcoal Pit." His portrait of his father is in the Dantzic museum. He died Sept. 14, 1915.

MEZZOTINT (mĕz'zō-tĭnt). See **Engraving.**

MIAMI, county seat of Dade County, Florida, on Biscayne Bay and on the Florida East Coast Railroad. It has a large trade in fish, fruit, cigars, vegetables and merchandise. The bank clearings average about $250,500,000 per year. The features include the high school, city hall, courthouse, Congress Building, News-Tower Building, and Federal Building. Many of the business buildings have from 15 to 20 stories. The manufacturers include bread, brooms, ironware, pottery, cigars, awnings and clothing. It was settled and incorporated in 1896. Population, 1925, 69,754.

MIAMI (Mī-ăm'ĭ), a river of Ohio, which has its source in Hardin County, and after a course of 150 miles toward the southwest discharges into the Ohio River twenty miles west of Cincinnati. The Little Miami River is about 25 miles east of the Miami. It has a course of 100 miles almost parallel to it, and flows into the Ohio River six miles above Cincinnati.

MIAMI INDIANS, a tribe of Algonquin Indians who inhabited a region extending along Green Bay and Lake Superior, where they were found by the French in the 17th century. At that time they occupied palisaded villages, but in 1721 large numbers of them scattered to different parts of the valleys of the Miami and Wabash rivers. Their hostility to the Iroquois induced them to show a spirit of friendship toward the English in 1755-60, but later difficulties arose between them and the settlers. Under the leadership of their chief Little Turtle they defeated General Saint Clair in 1791. Gen. Anthony Wayne was sent against them in 1794 and the following year they concluded a treaty of peace. Their lands from the Ohio to the Wabash were ceded in 1809. In the War of 1812 they fought against the Americans. They removed to Indiana in 1818, and in 1846 the tribe was transferred to a reservation in Kansas. The Miamis lost their identity by intermarrying with the Peorias and Pawpaws. The recent government reports show only 86 distinct Miamis.

MICA (mī'kà), a group of minerals having

certain allied characteristics, the most common being that they have a perfect basal cleavage, affording thin, tough scales. These scales or sheets may be so thin that it takes from 1,000 to 10,000 to equal an inch, this depending largely upon the class of mica. Some writers who have recently investigated this difficult group of minerals class them all with the monoclinic system, that is, crystallines possessing one symmetrical plane and dipping in only one direction from the axis of elevation. Some species of mica are brittle and break into small sheets or plates, but others are tough and occur in large plates fully twenty inches in diameter. They vary from colorless to jet black and from transparent to translucent, and are of widely different chemical composition. The constituents of most micas are made up essentially of silicates of aluminum and an alkali, as sodium, potassium, or lithium. Extensive deposits are found in North Carolina, New Hampshire, Oklahoma, Peru, Siberia, the Scandinavian peninsula, and Russia.

Among the different varieties are *paragonite,* or sodium mica; *muscovite,* or potassium mica; *zinnwaldite,* or lithium-iron mica; *lepidolite,* or lithium mica; *lepidomelane,* or iron mica; *phlogopite,* or magnesium; *biotite,* or magnesium-iron mica; and *roscoelite,* or vanadium mica. The principal use of mica is for lights in lanterns, stoves, and windows, its transparent quality making it of value for these purposes. It is less liable than glass to breakage by sudden change of temperature or discharge of large implements of war, on account of which it is employed extensively on battleships as a substitute for glass.

MICAH, one of the twelve minor prophets, usually given as sixth in the list. He is regarded a native of Gath and prophesied in the reigns of Jotham, Ahaz, and Hezekiah, kings of Judah. It is thought that he flourished as a contemporary of Hosea, Isaiah, and Amos about 759-698 B. C. Micah prophesied in a clear, vivid style, and his passages are richly poetical, the last several chapters being especially beautiful. His prophecies include predictions of the restoration of theocracy, promises of forgiveness, and a forecast of the destruction of Jerusalem. He exhorts earnestly to repentance, and denounces all forms of cruelty and wickedness of the rulers.

MICHAEL (mī'kā-ĕl), the angel who had special charge of the Jews as a nation, who is mentioned in Dan. x., 21, as "Michael your prince." He disputed with Satan about the body of Moses, and with his angels carried on war against Satan and his angels in the upper regions. The Jews regarded him as one of the archangels, and in the New Testament he is spoken of as the guardian angel of the church. Pope Felix instituted a festival of Saint Michael as early as 480, the day being known as Michaelmas, occurring on Sept. 29. This festival is retained by the Lutheran, Anglican, and other churches. In London the Lord Mayor is elected on Michaelmas day.

MICHAELANGELO. See **Angelo.**

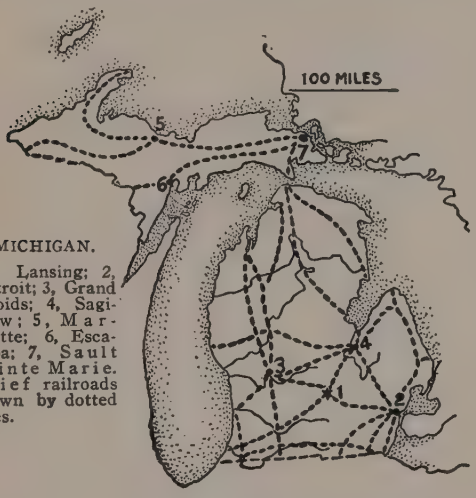
MICHEL (mē-shĕl'), **Louise,** communist, born in Vroncourt, France, in 1839; died Jan. 9, 1905. Her literary productions attracted the attention of Victor Hugo, who encouraged her to locate at Paris, where she opened a training school in 1860. After the Franco-German War she became noted as a revolutionary communist. In 1871 she was placed under arrest as an influential leader and was sentenced for life to New Caledonia. The general amnesty to political prisoners issued in 1880 released her, but she was arrested in 1883 for leading in the organization of communists' assemblies and was again imprisoned in 1886. She was editor for a time of the *Social Revolution,* but later settled in London, where she published a novel, entitled "Les Microbes de la Societe."

MICHELET (mē-sh'lā'), **Jules,** noted historian, born in Paris, France, Aug. 21, 1798; died Feb. 9, 1874. He secured a liberal education at Paris and in 1821 became professor of history in the College of Rollin, where he attained a reputation for close application and the publication of various historical works. Subsequent to the Revolution of 1830 he became the tutor of Princess Clementine and assistant to Guizot as a teacher of history at the Sorbonne. In 1838 he was chosen to teach history at the College of France, where he secured a professorship of moral philosophy. His teaching of certain moral precepts caused him to become involved in disputes with the Jesuits, against whom he published three separate books. During the Revolution of 1848 he remained active in pursuit of literary research, but lost his position in the archives office by refusing to swear allegiance to Napoleon III. after the downfall of Louis Philippe. Michelet was uncompromisingly hostile to the Jesuits, advocated with great energy the republic, and issued many pamphlets and letters advocating civil and industrial emancipation. Some of his history is marked by undue prejudice, but there are chapters that excel both in spirit and composition, such, for instance, as he employs in writing of Joan of Arc. After the establishment of the republic in 1871, it became his ambition to complete his historical works by writing "A History of the Nineteenth Century," but he died at the time it was brought down to the Battle of Waterloo. His most important writings include "History of France," "History of the Revolution," "Memoirs of Luther," "History of the Roman Republic," "Jesuits," and a number of works entitled "Mountains," "Woman," "Sea," "Insects," "Birds," and "Love."

MICHELSON, Albert Abraham, American physicist, born at Strelno, Germany, Dec. 19, 1852. He came to the United States at an early age, attended the public schools in San Francisco, and graduated at the United States Naval

Academy in 1873. Two years later he became a teacher at the academy, where he devoted his attention especially to experiments in physics. From 1886 until 1887 he studied in Europe, two years later became professor of physics at Clark University, and in 1892 was made head professor of physics in the University of Chicago. He was granted the Rumford medal by the Royal Society of London for his contributions to science, which include discoveries in relation to the velocity of light and improvement in the revolving mirror. In 1907 he received the Nobel prize for physics, being the first American to receive that recognition.

MICHIGAN (mĭsh'ĭ-gạn), a north central state of the United States, popularly called the *Wolverine State*. It is located in the region of the Great Lakes and consists of two peninsulas,



MICHIGAN.
1, Lansing; 2, Detroit; 3, Grand Rapids; 4, Saginaw; 5, Marquette; 6, Escanaba; 7, Sault Sainte Marie. Chief railroads shown by dotted lines.

known as the Upper and Lower. The two peninsulas are separated by the Straits of Mackinac. The Lower Peninsula is the larger and is bounded on the east by Lake Huron, the Saint Clair River, Lake Saint Clair, the Detroit River, and Lake Erie; south by Ohio and Indiana; and west by Lake Michigan. The Upper Peninsula is bounded on the north by Lake Superior; east by Saint Mary's River, which separates it from Canada; south by lakes Huron and Michigan and the State of Wisconsin; and west by Wisconsin and Lake Superior. Its length from north to south is about 340 miles and the average width is 185 miles. About 200 islands are included with the State, among them Drummond in Lake Huron, Beaver and North Manitou in Lake Michigan, and the Apostle Island in Lake Superior. The area is 58,915 square miles, including 1,485 square miles of water surface,

Description. The State has a coast line of 1,625 miles, being larger in proportion than that of any other State. Among the inlets on its coast are Saginaw and Thunder bays in Lake Huron, Green and Grand Traverse bays in Lake Michigan, and Keweenaw and Whitefish bays in Lake Superior. The Thumb, between Saginaw Bay and Lake Huron, and the Keweenaw peninsula in Lake Superior are the principal projections. In the Upper Peninsula the surface is hilly and rugged and at various points reaches altitudes of 1,500 feet. Porcupine Mountain, 2,022 feet, is the highest elevation in the State. It is located in a ridge known as the Porcupine Mountains, which include the famous Copper Range and extend toward the southwest into Wisconsin. In the Lower Peninsula the surface does not rise more than 600 feet above the lakes and the mean elevation above the lake level is about 200 feet.

The drainage is chiefly toward the south. In the northern part the rivers are comparatively small. They include the Ontonagon and the Taquamenon, draining into Lake Superior, and the Escanaba and the Manistique, draining into Lake Michigan. The Menominee, which forms a part of the boundary of Wisconsin, flows into Green Bay. In the southern part are the Grand, Manistee, Muskegon, Kalamazoo, and Saint Joseph rivers, flowing into Lake Michigan; the Au Sable, Cheboygan, and Saginaw, flowing into Lake Huron; and the Huron and Raisin, flowing into Lake Erie. The State has a great many lakes, including about 5,000 of considerable size, and many of them have no visible outlets. Among the larger lakes are Torch, Higgins, Hubbard, Houghton, Gogebic, Cheboygan, Otsego, and Michigamme. On the eastern boundary are the Detroit and Saint Clair rivers, which connect Lake Saint Clair with lakes Huron and Erie and separate Michigan from Ontario. The Saint Mary's River forms part of the eastern boundary of the Upper Peninsula.

The climate is much more severe in the north than in the south. As a whole the summers are cool and the winters are severe in the north, where the snowfall is very heavy. In the south the climate is mild, being modified by the prevailing winds from the southwest and the proximity of three of the Great Lakes. At Ann Arbor, in the southern part, the snowfall is 30 inches, while at Houghton it is 130 inches, the heaviest in the United States. In the south the rainfall is about 30 inches, and the precipitation is quite evenly divided throughout the year. At Lansing the average temperature is about 46°, with extremes ranging from 100° in July to 20° below zero in winter. In the Keweenaw Peninsula the thermometer frequently falls to 30° below zero. All of the northern section is subject to frequent cold waves.

Mining. Michigan ranks high in the production of copper. The annual output is 72,650 long tons, fully eight per cent. of the total output for the United States, and this yield is exceeded only by several of the states. The Calumet and Hecla mines continue to yield over one-half of the total production in the State. In the output of iron, which at present is the chief mineral, Michigan also takes high rank

and is exceeded only by Minnesota. At present the yield of iron per annum is 14,500,000 long tons, valued at $38,500,000. Michigan was the leading salt-producing State until 1893, in which year it was displaced by New York until 1901, when Michigan again reclaimed its place as the leading State in salt production. The yield per annum is 9,200,000 barrels, about 38 per cent. of the output of the United States. In the production of cement Michigan holds high rank, producing annually an output valued at $16,275,000. Bituminous coal of a superior grade is mined profitably. Other minerals include gold, commercial clays, and mineral waters. Large quantities of building stones occur, including granite, limestone, and sandstone.

Agriculture. The southern part is fertile and its surface has been cleared largely of its forests and rendered suitable for cultivation. About one-half of the area is included in farms, which average 86 acres each. The central part of the State has a sandy soil and tracts of sandy land extend along various portions of the lakes, especially along Lake Michigan. Corn is grown extensively in the south, while wheat, oats, barley, buckwheat, and vegetables thrive in all parts of the Lower Peninsula. Michigan usually has second rank in the production of sugar beets and is celebrated for the quality and quantity of its peaches, apples, plums, and cherries. About ten million peach trees bear fruit and the number of bearing apple trees is somewhat larger. The State has a large production of celery, peppermint, potatoes, chickory, and beans.

Cattle raising for meat and dairy products is an important enterprise, much of the product being sold in the larger cities of the State and in Chicago and Indianapolis. The live-stock industry is favored by the growth of nutritious grasses, the acreage of which is about equal to that of both corn and oats. Horses of a superior grade are grown for local use and for exportation. In the number of sheep it is exceeded only by one State east of the Mississippi, the State of Ohio, and it has almost equally large interests in rearing swine. Poultry is grown extensively and large interests are vested in rearing mules.

Manufactures. Michigan possesses a variety of materials useful in manufacturing enterprises. In the northern part are large forests of pine, beech, elm, hemlock, oak, and other valuable woods. Lumber and timber products take rank among the leading manufactures of the State. The flouring and grist mill industry is likewise important, and the milling is done largely at points where water power and superior shipping facilities are available. Grand Rapids and Detroit have extensive interests in meat packing. Large furniture factories and machine shops are located in several cities. It holds a particularly high rank in the output of machinery, beet sugar, and automobiles. Kalamazoo is a center for the manufacture of paper and wood pulp. Other products include chemicals, farming implements, steel and iron, clothing, and tobacco products. Large quantities of fruit are canned or cured for the market and several cities have manufactures of foodstuffs, such as postum, shredded wheat, and oat meal. The fisheries of the lakes yield many varieties of fresh-water fish, large quantities of which are marketed fresh or as canned products.

Transportation and Commerce. All parts of the State have extensive railroad facilities, but the larger systems are represented in the southern part. These lines furnish direct communication through the southern section from Chicago to points in Eastern Canada and the United States, both by the way of Detroit and Cleveland. The railways aggregate a total of 8,600 miles. Though the rivers furnish an abundance of water power, they supply only a limited amount of navigation facilities. Being located on four of the Great Lakes, it has unusual advantages in communication by water. Several excellent canals have been provided, including Saint Clair Canal, completed in 1871, and Saint Mary's Ship Canal, an important improvement on the Saint Mary's River, the latter having greater transportation interests than the Suez Canal of Africa.

The State occupies an important position in domestic and foreign commerce. Large quantities of lumber, iron ore, fruit, and salt are exported. These exports have a wide sale in various parts of the United States and foreign countries, especially iron ore, which is taken to the smelters of Illinois and Ohio. Other exports include machinery, paper, leather, and furniture. Considerable quantities of food products and clothing are imported. Detroit and Grand Rapids have large jobbing and wholesale establishments.

Education. The educational system of Michigan consists of (a) the public schools under the three subdivisions: primary districts, graded schools, and city districts; (b) the State normal schools as follows: the State Normal College at Ypsilanti, the Central Michigan Normal School at Mount Pleasant, the Northern State Normal School at Marquette, and the Western State Normal School at Kalamazoo; (c) the University of Michigan at Ann Arbor. In addition to these institutions, the law provides for country normal training classes for teachers in the primary school districts. Forty counties have established these classes and enroll about one thousand pupils annually. The foregoing institutions are all public and are sustained by taxation.

The educational system is so arranged and adjusted that pupils may begin their work in the primary districts, whence they pass through the articulated courses of the high schools and enter the normal schools and the university. This system is not only closely articulated, but it is made effective for all classes of people. In ad-

dition to the State educational institutions that are for all children, the State maintains a public school for dependent children, industrial schools for boys and girls, and institutions for the instruction of the deaf and blind. About 27,000 teachers are employed in the public schools, and 6,925 school districts are maintained, including the primary, graded, and city districts. One hundred of these are incorporated cities. In the Upper Peninsula the township district prevails, while in the Lower Peninsula the primary district system is maintained. The Michigan State College, situated near Lansing, is the first one of the kind established in the United States and is at present the largest institution of this class in the country. Other institutions of higher learning include Adrian College, Adrian; Battle Creek College, Battle Creek; Detroit College, Detroit; Hope College, Holland; Kalamazoo College, Kalamazoo; Hillsdale College, Hillsdale; Alma College, Alma; Olivet College, Olivet; and Benzonia College, Benzonia.

Penitentiaries are located at Jackson and Marquette, a house of correction is at Ionia, the industrial school for girls is at Adrian, and the industrial school for boys is at Lansing. Grand Rapids has a State soldiers' home and Lapeer has an institution for the feeble-minded. Coldwater is the seat of a school for feeble-minded children and Flint has a school for the deaf and dumb. Hospitals for the insane are maintained at Newberry, Kalamazoo, Pontiac, and Traverse City.

GOVERNMENT. The constitution was originally adopted in 1835, but it was materially revised at various times since, particularly in 1850 and in 1900. By it the chief executive authority is vested in the Governor and the Lieutenant Governor, who are elected for terms of two years. Other State officers include the secretary, auditor, treasurer, attorney-general, and superintendent of public instruction, all serving for two years. The legislative authority is vested in the General Assembly, which consists of 32 senators and 100 representatives, all of whom serve for two years and may be reëlected. Sessions of the Legislature are held biennially. Eight justices, one of whom is chief justice, constitute the supreme court, all of these judges being elected for terms of eight years. The circuit judges, who preside over the circuit courts, are elected for six years. Each county has a court of probate and each township may have not to exceed four justices of the peace. The local government of cities and towns is administered by a mayor and a city or town council.

INHABITANTS. The State has 63.8 persons to the square mile, but the southern part has the greater share of the inhabitants. However, there has been a steady increase of the population of the northern part, owing partly to the construction of railways and extensive developments of the iron and copper mines. The foreign born inhabitants consist largely of Canadians and Germans. Lansing, in the south central part, is the capital. Detroit, Grand Rapids, and Saginaw are the largest cities. Other important cities include Bay City, Jackson, Kalamazoo, Muskegon, Port Huron, Battle Creek, Ann Arbor, Manistee, Flint, and West Bay City. The largest cities of the Upper Peninsula include Laurium, Ishpeming, Menominee, Marquette, Hancock, Escanaba, and Ironwood. In 1900 the State had a population of 2,420,982. This included a colored population of 22,419, of which 6,354 were Indians and 15,816 were Negroes. Population, 1920, 3,667,222.

HISTORY. The region occupied by Michigan was first visited by the French in 1610. It was explored by French Jesuits in 1641. Father Marquette founded a mission at Sault Sainte Marie in 1668, and three years later a settlement was established on the present site of Mackinac. Detroit was founded in 1701, but the population did not increase rapidly until after the French surrendered their claim to the English by the Treaty of Paris. Mackinac was destroyed and its garrison was massacred at the time of Pontiac's War, and Detroit was besieged for five months during these troubles with the Indians. The territory became part of Canada in 1774 and in 1783 it was ceded to the United States, though the English did not relinquish possession until in 1786. It was then known as the Northwest Territory, from which Ohio was set off in 1800. Two years later the Lower Peninsula was made a part of the Territory of Indiana.

Michigan was set off in a separate Territory in 1885, when William Hull was made Governor. It was the scene of British and Indian raids during the War of 1812, when Mackinac, Detroit, and Frenchtown fell into the hands of the British, who were later defeated by Commodore Perry on Lake Erie. Owing to a dispute in regard to the southern boundary, where a strip of land was claimed by Ohio, it was not admitted as a State until 1837. The capital was removed from Detroit to Lansing in 1847. Prohibition of the sale of liquor became a part of the constitution in 1853, but it was abolished in 1876, and was finally legalized to take effect in 1918. For the past quarter of a century the State has grown rapidly in wealth, population, and educational development.

MICHIGAN, Lake, one of the five great lakes of North America, third in size of the group, and the only one that is situated wholly within the United States. It separates the two peninsulas of Michigan and extends between the states of Michigan and Wisconsin, forming also a part of the boundary of Illinois and Indiana. The length from north to south is 350 miles, the average width is 60 miles, and the area is 22,450 square miles. Few high bluffs characterize the shore, which is mostly low and sandy. In many places the sand hills a short distance inland have

a height of 150 feet. The principal inlets include Grand Traverse and Green bays, and the most important harbors are at Chicago, Milwaukee, Sheboygan, Michigan City, Muskegon, and Racine. Its greatest depth is about 1,000 feet and the elevation above sea level is about 581 feet. Numerous lighthouses and important fisheries are off its shores. Among the rivers that discharge into it are the Muskegon, the Saint Joseph, the Kalamazoo, the Grand, and the Manistee. Lake Michigan discharges into Lake Huron by the Strait of Mackinac, but some of the outflow is carried through the Chicago Drainage Canal into the Mississippi system.

MICHIGAN, University of, an educational institution at Ann Arbor, Mich. It was founded in 1837 on a tract of land set apart by Congress in 1826. In 1841 it was opened for instruction and the first class graduated in 1845. Originally a number of preparatory schools were affiliated with it, but these were discontinued or merged into high schools. The departments include those of engineering, law, literature, pharmacy, science and arts, dentistry, medicine and surgery, philosophy, and preparatory courses. A very high standard of efficiency and scholarship is maintained. It was made coeducational in 1870 and now has a large proportion of female students. The gross income is $5,200,000, the property has a value of $25,535,056, and the library contains 600,000 volumes. The average annual attendance is about 10,400 students.

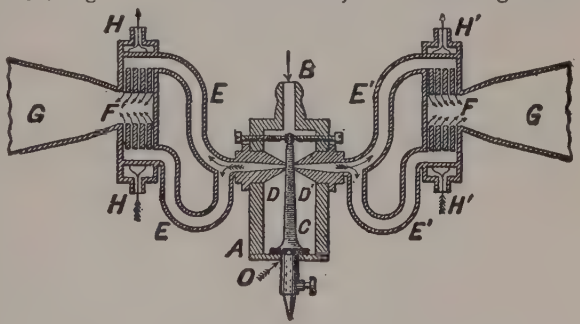
MICHIGAN CITY, a city of Indiana, in Laporte County, 38 miles southeast of Chicago, Ill. It is the only port on Lake Michigan in Indiana and is on the Michigan Central, the Père Marquette, the Lake Erie and Western, and other railroads. The chief buildings include the public library, the high school, the Federal life-saving station, the Northern Indiana State Prison, and the Saint Marie's Academy. Among the manufactures are furniture, cigars, boots and shoes, lumber products, hosiery, railroad cars, and machinery. It has a large trade in lumber, salt, grain, and iron ore. The place was platted in 1832 and incorporated in 1837. Population, 1900, 14,850; in 1920, 19,457.

MICKIEWICZ (mĭts-kyā'vĭch), **Adam,** Polish poet, born near Novogrodek, in the Russian government of Minsk, in 1798; died in Constantinople, Turkey, Nov. 27, 1855. He was educated in Vilna and engaged exclusively in literature and as a teacher. His chief writings include "Lectures on Slavic Literature," "Sonnets," the epic "Wallenrod," and "Books of the Polish Nation." Several of his works have been widely translated.

MICROMETER (mī-krŏm'ē-tĕr), an instrument for measuring small distances accurately, or to obtain the measurements of the diameters of small spheres. Various forms of this device are in use. A simple micrometer consists of a U-shaped piece of brass or steel. Through one arm is fitted a screw, which is turned by means of a head. On the inner metal sleeve is a longitudinal scale and each end of the outer sleeve has a circular scale. The measurement is taken by placing the body between the screw and one arm of the instrument, and the diameter is measured by reading both the circular and longitudinal scales. Another kind of micrometer is attached to a telescope or microscope, called a *position micrometer,* and is used to measure linear distances more accurately than is possible by using a simple rule or scale.

MICROPHONE (mī'krō-fōn), an instrument invented by Prof. Hughes in 1878, which is used to increase the intensity of low sounds. A number of forms have been constructed, but the essential feature in all is to carry faint sounds to a more sonorous body, which emits a more audible sound. This is effected by placing a piece of charcoal between two blocks of carbon and making connection with a telephone. The slightest sound made on the wooden support of the charcoal is magnified enormously. To a person placing the ear-piece of the telephone to his ear the tread of a fly becomes audible. The ordinary carbon telephone transmitter depends on the principle of the microphone.

In a new megaphone exhibited in the French Academy of Sciences, in 1908, the sound vibrations are transmitted to and from a convenient flame. Air and acetylene are used as burning gases. In the illustration, the distributing mech-



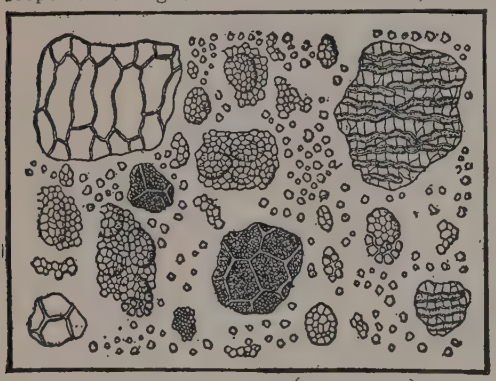
FLAME MICROPHONE.

anism consists of a chamber, *A,* into which the combustible mixture is introduced under pressure through a conduit, *B.* A vane, *C,* supported on knife edges at *O,* is mounted at the bottom of the chamber, *A,* an elastic ring being provided to insure airtightness in *O.* Any motion given to the pencil is transmitted to the vane, *C,* inside of the distributor. On either side of *C* openings, *D* and *D'*, are provided through which the gaseous mixtures are allowed to issue in respectively equal amounts as long as the vane is immovable. Any displacement of *C* will, however, result in an increase of the amount of gas issuing on one side, while the amount issuing on the other side is reduced.

The total amount of utilized mixture remains constant, and the pressure in the interior of the chamber is also unaltered.

The gases are collected and conveyed to the burners through a series of conduits, E, E, E', E'. The burners consist of a series of disks cooled by an air current, $H H'$, the gases being expanded and reduced to a temperature such that combustion always occurs in the chamber, $F F'$, just at the point where the gases escape from the openings of the burner. The apparatus further comprises two funnels, $G G'$. The power of the sounds obtained, which is truly remarkable, depends on the amount of gas mixture used and on the energy expended during its combustion.

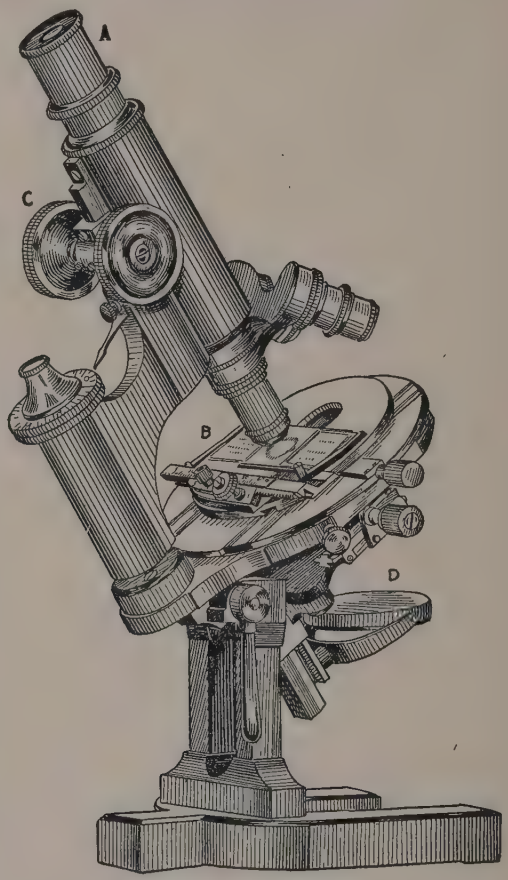
MICROSCOPE (mī'krŏ-skōp), an optical instrument designed to examine minute objects or parts of objects, which so magnifies otherwise invisible or indistinct details that their structure or texture may be seen clearly. Simple forms of the microscope have been in use from an early period, perhaps prior to the Christian era, but the more powerful compound microscope is thought to date from 1590, when



GRAINS OF RICE FLOUR (MAGNIFIED).

Zacharias Jansen, a spectacle maker at Middelburg, Holland, began their manufacture. The first modern specimen was brought to England in 1617 by Cornelius Drebbel, who came from Holland to serve as mathematician to James I. The principle involved consists of interposing between the eye and the object to be examined a magnifying lens, in the manner of a magnifying glass. It may consist either of a single lens or a number of lenses, but when the latter is the case the construction is such that they can be used as one or all in combination.

In the simple microscope the lens is formed of glass ground in such a way that when placed between the object to be examined and the eye it changes the direction of the rays of light, with the effect that more are brought to bear upon the object, causing it to appear much larger than it really is. A compound microscope has a combination of lenses arranged so a magnified image of the object is projected by one lens in the manner of a magic lantern, and this image is further magnified by a second power, as in the simple microscope, thus producing results vastly more powerful. The first lens of a compound microscope is called the *object glass,* or *objective,* and the second is known as the *ocular,* or *eyepiece.* The object glass is the more important, and the shorter its focus the larger is the image produced. A *monocular* microscope presents an image to only one eye and a *binocular* microscope is constructed for the use of both eyes. In the latter advantage is taken of several methods for dividing by prisms the pencils of rays from the objective, which diverge to eyepieces properly placed. A *solar*



MONOCULAR MICROSCOPE.

A, Eye-piece; *B,* Object glass; *C,* Screw to focus tubes; *D,* Mirror to reflect light on object to be examined.

microscope is one in which a lens condenses the sun's rays upon an object placed in its focus, and intense illumination causes the objective to project a greatly enlarged image. The *electric* microscope utilizes the rays from an electric light in a similar way, while the *lucernal* microscope employs a lamp to illuminate the object, and the *oxyhydrogen* microscope employs the light from lime made incandescent by the oxyhydrogen flame.

The first microscopes of a high character manufactured in the United States date from 1847. At present there are many periodicals and associations that are devoted exclusively to microscopic research. While the telescope has brought the heavenly bodies to us for examination, the microscope has enlarged and extended our vision so we may study myriads of forms in and about us that formerly were wholly unknown. The microscope is used in many fields of investigation. It has aided in the study of plants, minerals, and animals, and is the medium that brought about the achievements of Koch, Darwin, and Pasteur. With this instrument it is possible to magnify objects several thousand times. By the use of the most powerful instruments minute particles, equaling the one-millionth of an inch, can be seen.

MIDAS (mī'dąs), a wealthy king of ancient Phrygia, who so pleased Dionysius by treating his friend Silenus with kindness that he offered to grant him any favor he chose to demand. The wealthy monarch, greedy for vast possessions, requested that everything he touched might turn to gold, whereupon Dionysius complied in so literal a sense that even his wine and food became changed into the metal. At last he prayed to be relieved from the fatal gift, and Dionysius, pitying his unhappy plight, directed him to bathe in the Pactolus River, a small stream of Lydia, in order to lose the power which had become the bane of his life. To these instructions Midas gave willing obedience, and was at once freed from the consequences of his avaricious demand. It is said that the Pactolus River has since been noted for containing grains of gold amid its sand.

MIDDLE AGES, or Mediaeval Period, a period of history which extends from the decline of the Roman Empire until the revival of letters in Europe. It is sometimes extended to embrace the entire period of time between the ancient and modern civilizations. Some writers place the beginning of the period at the time of the invasion of France by Clovis, in 486 A. D., and the end at the invasion of Naples by Charles VIII., in 1495. Others fix the beginning at the overthrow of the Western Roman Empire, in 476, by Odoacer and some writers at the time when Charlemagne became emperor of the West, in 800, while its end is placed by these writers at the close of the Reformation in Germany, the invention of printing, the discovery of America by Columbus, and the Peace of Westphalia in 1648. Some writers term this period the Dark Ages and make it include the time between the classical literature of Greece and Rome and the literature of modern Germany, a period when learning was at its lowest ebb. Among the noteworthy incidents of interest occurring in the Middle Ages are the widespread establishment of the feudal system, the rise of the Roman Hierarchy, the Crusades, the development of German, Italian, and French nationalities, the Norman conquest of England, and the establishment of the Holy Roman (or German) Empire.

MIDDLEBORO (mĭd'd'l-bŭr-ō), a town of Massachusetts, in Plymouth County, on the Nemasket River, nine miles east of Taunton. It is on the New York, New Haven and Hartford Railroad and has communication by electric railways. The chief buildings include the town-hall, the public library, and several schools and churches. The picturesque scenery makes it an attractive summer resort. Among the manufactures are boots and shoes, woolen goods, lumber products, and brass goods. It has a growing trade in merchandise. The place was settled in 1662 and was incorporated in 1669. Population, 1905, 6,888; in 1925, 9,136.

MIDDLESBROUGH (mĭd'd'lz-b'rŭh), a city of England, in Yorkshire, near the mouth of the Tees River, 46 miles north of York. It is one of the modern cities of England, having been founded in 1829. Its prosperity dates from the discovery of immense deposits of iron ore in 1840. The city has a well-improved harbor and modern municipal facilities, including pavements, gas and electric lighting, sanitary sewerage, and street railways. The manufactures include ironware, rails, engines, boilers, pottery, steamboats, clothing, chemicals, and tubes. Among the noteworthy buildings are the customhouse, the public hall, the high school, and many fine churches. The place was incorporated in 1853, after which the harbor was greatly improved. Population, 1921, 104,787.

MIDDLETOWN, a city of Connecticut, county seat of Middlesex County, on the Connecticut River, fifteen miles south of Hartford. It is on the New York, New Haven and Hartford Railroad and on several interurban electric railways. The noteworthy buildings include the Wesleyan University, the Berkeley Divinity School, the Russell Free Library, an industrial school for girls, and an asylum for the insane. Portland, on the opposite side of the river, has extensive brownstone quarries. Among the manufactures are lace, cotton and woolen goods, machinery, hardware, and clothing. It has a large trade by river navigation. Middletown was settled in 1650 and was chartered as a city in 1784. Population, 1920, 13,638.

MIDDLETOWN, a city of New York, in Orange County, on the Wallkill River, 65 miles northwest of New York City. It is on the Erie, the New York, Ontario and Western, and other railroads, and is surrounded by a fine farming, dairying, and stock-raising country. It has a fine high school, a public library, and the State Hospital for the Insane. The manufactures include jewelry, condensed milk, hardware, printers' supplies, hats, and clothing. It was settled before the Revolution, became a village in 1848, and was chartered as a city in 1888. Population, 1905, 14,516; in 1925, 20,412.

MIDDLETOWN, a city of Ohio, in Butler

County, on the Miami River, 34 miles northeast of Cincinnati. It is on the Miami and Erie Canal and on the Cincinnati, Hamilton and Dayton, the Cleveland, Cincinnati, Chicago and Saint Louis, and other railroads. The noteworthy buildings include the high schools, the public library, the Masonic Temple, and the post office. It has a growing trade in farm produce and merchandise. The manufactures include tobacco, paper, flour, machinery, hardware, edged instruments, and utensils. It has systems of public lighting, waterworks, and sanitary sewerage. The vicinity was settled in 1794. Population, 1900, 9,215; in 1920, 23,504.

MIDDLETOWN, a borough of Pennsylvania, in Dauphin County, on the Susquehanna River, nine miles southeast of Harrisburg. It is on the Pennsylvania and on the Pittsburg and Reading railroads, and is surrounded by a farming and lumbering country. Among the chief buildings are the public library, the high school, and the Frey Orphans' School. The manufactures include stoves, chemicals, furniture, furnaces, railroad cars, engines, and hardware. It has electric lights and street railways, city waterworks, and well-graded streets. The place was settled in 1756 and incorporated in 1828. Population, 1900, 5,608; in 1920, 5,920.

MIDIANITES (mĭd'ĭ-ăn-īts), an ancient race of Arabia, according to Scripture, the descendants of Midian, the son of Abraham by Keturah. They inhabited a large area near the Dead Sea, in Syria, their possessions extending from the plains of Moab to the Red Sea. Their trade with Egypt was extensive, especially in live stock, cereals, and fruits. In the time of the Romans their mines possessed much value. The Scriptures mention the Midianites as being hostile to the Israelites. They were conquered by Gideon and worshiped Baal-Peor. The Midian sheik Jethro was the father-in-law of Moses, being a member of a Cushite tribe of the same name.

MIDLAND, a town in Simcoe County, Ont., 100 miles north of Hamilton, on the Canadian National Railway. It has extensive iron smelting, boat building, and machine shops. The features include the high school, public library, city hall, and grain elevators. It was settled in 1870 and incorporated in 1890. Population, 1921, 7,016.

MIFFLIN (mĭf'flĭn), **Thomas,** soldier and statesman, born in Philadelphia, Pa., in 1744; died Jan. 20, 1800. He was opposed to the military tactics of Washington, deeming them too Fabian, and was prominent in the so-called Conway Cabal, which sought to dismiss Washington from the supreme command. Greene superseded him in 1778 as quartermaster general. He was elected to Congress in 1782. In 1790 he was elected Governor of Pennsylvania, serving until the time of his death.

MIGNONETTE (mĭn-yŭn-ĕt'), a plant native to the northern part of Africa, but now widely naturalized and cultivated for its highly fragrant flowers. The leaves are wedge-shaped, the flowers are whitish or greenish-yellow with fringed petals, and the seed vessels open at the top. In America it is an annual, but in the country of its nativity it is a perennial. The name by which it is known is from the French and signifies "Little Darling."

MIGRATION (mī-grā'shŭn), a term applied to the act of migrating or removing from one region or country to another. Migration has been studied particularly in relation to periodical movements of animals from one region to another. Many genera and species of birds in all parts of the Temperate zones migrate at reasonably certain periods of the year to other parts. Most generally they spend the winter in the warm regions of the tropics and the spring and summer in the temperate portions of higher latitudes. Some of the birds, as the swallows, ducks, geese, cranes, swans, and many others, migrate in large bodies, while others move singly toward the point of destination. It has been observed that most birds prefer to pursue their flight against the wind, some even resting during the flight while the atmospheric movements are unfavorable. Many fishes move periodically into streams and fresh-water bodies from the sea to deposit their eggs and various classes of insects, such as the locusts, ants, and others, change localities by flight or by moving in vast colonies. The migratory grasshoppers of the United States have been studied with interest, as well as those of Eurasia and Africa. Many of the mammals are inclined to migrate, as, for instance, the bisons of North America in an early period, but most species of mammals rather make incursions than periodical movements.

Some writers have accounted for migration on the basis of instinct, but others ascribe the phenomenon in birds to the search for food, which has become exaggerated by the power of flight. Likewise, the migration of locusts is ascribed to hunger resulting from a lack of food in the vicinity long occupied. The migration of fishes is thought to be due to a desire to deposit their spawn in favorable localities. In botany, the term is applied to the tendency that feathery or downy seeds have to be carried by the wind, and in others to their transportation by streams and oceanic movements to regions far remote from the place of growth. Migrations of man have been directed chiefly by personal interest. They are governed largely by latitude, settlements being formed most generally in regions having a climate quite similar to those from which the emigration takes place.

MILAN (mĭ'lăn), a city of Italy, on the Olona River, 25 miles south of Lake Coma. It is the capital of the province of Milan. The city is surrounded by three walls, which may be entered by twelve gates, and is now the most important railroad center of Lombardy. The streets are broad, well paved, and lighted by

electricity. It has railroad facilities and an extensive system of electric street railways. Although the city dates from remote antiquity, it has few ancient buildings, owing to successive wars, but there are several dating from the Revival of Learning that take high rank for beauty and architecture. The most prominent building is the Duomo or Cathedral, a Gothic structure, which ranks next to Saint Peter's in Rome as the most excellent of Italy. Other noteworthy structures include the Church of Saint George, the Church of Saint Ambrose, founded in the 4th century, and the Church of Saint Nazaro, a modern structure of great beauty. The La Scala theater has accommodation for 3,600 persons and is the finest in the city.

Fine works of art are in many of the public places and in the historic buildings, among them products by Mantegña, Titian, Vandyck, and Raphael. The Ambrosian library contains 175,000 volumes and the national library at Milan has 190,000. It has many collections of engravings, paintings, and statues. Near the center of the city is an open space called the Piazza del Duomo, or Cathedral Square, in which is an amphitheater with a seating capacity for 30,000 persons. It has a number of excellent schools, hospitals, colleges, and universities. The manufactures include cotton, silk, and woolen goods, boots and shoes, lace, jewelry, carpets, cheese, tobacco, porcelain, hats, velvets, ironware, machinery, and railroad cars. It is a financial and banking center. Many large printing establishments, both of books and periodicals, are located here.

Milan has an interesting history, authentic dates occurring as early as 222 B. C., when it was conquered by a Roman army. Roman occupation caused it to rise as a center of wealth, literary taste, and political influence, and in the 4th century A. D., Maximilian made it the residence of the imperial court. The Huns under Attila sacked it in 452. Later it passed into possession of the Goths, Longobards, and Franks, and in 774 it became a part of the German Empire. Here Charlemagne was crowned and it was the place of coronation of the German emperors as kings of Italy. Milan was the head of the Lombard League in the 11th century. It was made the capital of the Ghibellines in 1395 and after 1545 the city passed successively to Spain, Austria, and France. Its fortune was that of various sovereigns and nations until in 1859, when the Treaty of Villafranca annexed it and the whole of Lombardy to Piedmont. Population, 1922, 663,241.

MILAN I. (mē'lăn), **Obrenovitch,** King of Servia, born at Manassee, Rumania, Aug. 22, 1854; died at Vienna, Austria, Feb. 11, 1901. He was a second cousin of Michel Obrenovitch III., who was assassinated in 1868, and was educated in Paris. In 1868 he was recalled to Servia, where he was proclaimed prince, but the government was administered by a council of regents until 1872, when he assumed full authority. Servia revolted against the Turks in 1876, but its alliance with Russia in the Russo-Turkish War saved its integrity after the defeat of the Servian army, and in 1882 the country was proclaimed and recognized as a kingdom. The following year a rebellion broke out on account of an increase in taxation, but it was subdued promptly. A war with Bulgaria would have resulted disastrous to Servia had Austria remained neutral, but that country saved its integrity by intervention. A new constitution was granted in 1889, but he abdicated the same year in favor of his son, Alexander, and subsequently resided in Paris until 1895, when he returned to Servia and shortly after was made commander in chief of the Servian army. Milan I. married Natalie, the daughter of a Russian colonel, in 1875.

MILAN CATHEDRAL, one of the most famous Gothic cathedrals of the world, located in Milan, Italy. It ranks next to Saint Peter's at Rome in size and importance as an ecclesiastical structure. The length is 486 feet; breadth, 287 feet; and height of the tower, 356 feet. It contains about 2,000 statues, besides a vast number of carvings and paintings. The building is mainly of Carrara marble. Gian Galeazzo Visconti laid the foundation in 1386, but many celebrated architects and artists contributed toward its completion. Napoleon was crowned King of Italy in this cathedral in 1805.

MILBURN (mĭl'bûrn), **William Henry,** clergyman, born in Philadelphia, Pa., Sept. 26, 1823; died April 10, 1903. He had defective sight when a youth, but secured an education at Illinois College, and in 1843 was ordained a minister of the Methodist Church. He served as chaplain of the House of Representatives at Washington a number of years, lectured with marked success in England in 1859, and became noted as an active and influential advocate of Methodism. Among may publications issued by him are "Ten Years of Preacher-Life," "Rifle, Axe, and Saddlebags," and "Pioneers and People of the Mississippi Valley."

MILDEW (mĭl'dū), a name for several diseases of plants, which are caused by fungous parasites. They include many minute and sometimes microscopic parasitical forms. The different species of plants are attacked by their own peculiar parasites, but there are several kinds of fungi that infest the same plant. Mildew appears most frequently at the time when the weather is unfavorable to the growth of vegetation. It is quite abundant on plants in a weakened condition and sometimes on fruits and clothing. About 150 species have been described, most of which belong to two classes, the *false,* or *downy,* mildews, and the *true,* or *powdery,* mildews. The *black mildew* common to corn, the *brown mildew* found in the pear, and the *destructive mildew* injurious to the barberry

are among the most harmful. Sulphur is an effectual preventive and destroying agency.

MILE, a measure of length used in the United States and many other countries. The statute mile adopted in the reign of Queen Elizabeth contains 5,280 feet and is used at present in the United States and in Great Britain. The following table shows a comparison of the principal miles used in various countries:

United States and Great Britain statute mile	=1
Old Roman mile	=0.9193
Geographical or Nautical mile	=1.153
German mile	=4.611
German long mile	=5.753
German short mile	=3.897
Prussian mile	=4.680
Swedish mile	=6.648
Danish mile	=4.684
Scotch mile	=1.123
Irish mile	=1.273
Welsh mile	=about 4 English miles

MILE END, a town of Quebec, in Hochelaga County, on the Saint Lawrence River, five miles from Montreal. It is on the Canadian Pacific Railroad, has electric railways, and is the residence of many Montreal business men. The buildings include a number of fine schools and churches. It has waterworks, electric lighting, and a public library. Population, 10,933.

MILES, Nelson Appleton, soldier, born in Westminster, Mass., Aug. 8, 1839; died May 15, 1925. He studied in his native town and Boston, and at the beginning of the Civil War was commissioned first lieutenant of the 22d Massachusetts volunteers. He accompanied the army of the Potomac in practically every battle, rendered distinguished service in the battles of Williamsburg, Fair Oaks, Gaines's Mill, and Fredericksburg, where he was wounded, and later was carried off the battlefield at Chancellorsville with the supposition that his wounds would prove fatal. He recovered sufficiently to report for duty in 1863 and afterward served in the Battle of the Wilderness, at Petersburg, and at Richmond, taking part until Lee's surrender near Appomattox in 1865. In the latter year he was made major general of volunteers, and the following year became colonel of the 40th United States infantry. After 1865 he took an active part in many of the Indian fights on the border, rose rapidly in rank, and in 1890 became major general. In 1894 he commanded the United States troops in the railroad strike at Chicago. He was made commander of the United States army by President Cleveland in 1895, being the first man to be raised to that position who had not graduated from West Point. In 1898 he planned and commanded the Porto Rican expedition in the Spanish-American War, and showed much efficiency in every department in which he was engaged. He retired in 1903. He published several works, including "Personal Recollections" and "Military Europe."

NELSON A. MILES.

MILETUS (mī-lē'tŭs), an ancient city of Asia Minor, situated in Ionia, on the Meander River. It is noted principally because of its extensive colonies in the Crimea, on the Black Sea, and other parts of Europe and Asia. Miletus had fully eighty different colonies, all of which contributed to the maintenance of a formidable fleet and took an active part in military operations against the Lydian kings. In 494 B. C. the Persians under Cyrus conquered the city, and later it was captured by Darius and nearly ruined. It fell a prey to Alexander the Great, and its final ruin was accomplished by the Turks. During its prosperity it was noted as a center for the manufacture of woolen goods, furniture, and carpets. At that time it had an extensive trade. Miletus was the birthplace of Anaximander, Thales, and many other important personages. The place was visited by Saint Paul.

MILFORD (mĭl'fĕrd), a city of Massachusetts, in Worcester County, on the Charles River, seventeen miles southeast of Worcester. It is on the Boston and Albany and the New York, New Haven and Hartford railroads. Extensive granite quarries are worked in the vicinity. The noteworthy buildings include the public library, the high school, a memorial hall, and many churches. Among the manufactures are straw goods, boots and shoes, cement, ironware, machinery, elastic fabrics, and utensils. It has a considerable trade in merchandise. The place was settled in 1669 and incorporated in 1780. Population, 1905, 12,105; in 1925, 14,781.

MILITARY SCHOOLS, the institutions founded and maintained by states and countries for the purpose of training young men in the arts of war. This training is directed by instructors of recognized ability and embraces courses in all phases of military duties, such as military engineering, strategy, and discipline. The most important military school of the United States is situated at West Point, N. Y., known as the United States Military Academy. The Virginia Military Institute, located at Lexington, Va., was founded in 1839. It is the most notable military school maintained by a state and ranks next to the United States Military Academy. The Kentucky Military Institute, at Farmdale, has been in a flourishing condition since 1846. Military schools are maintained in a number of other states, especially in the Southern States. In 1917 the government established many training camps, known as *cantonments,* for housing and training military forces.

The Federal government of the United States has a body of detailed commissioned officers of

the army for the purpose of instructing in military science and tactics at colleges and academies designated by the general government. In addition, military branches of instruction are a part of the courses of many state institutions. The private institutions of higher learning have generally followed the plan of establishing such instruction. At present about 10,000 persons take training in military science annually in the United States. Admission to military schools is generally limited to young men of good moral character, physical perfection, and superior muscular skill. Several highly efficient royal schools of military instruction are maintained in Canada. These include the Royal School of Cavalry, Toronto; the Royal School of Instruction, Winnipeg; the Royal School of Artillery, Quebec; and the Canadian School of Musketry, Ottawa. Schools for military training are maintained by all civilized countries, those of France, Germany, Austria, England, and Russia being particularly efficient. See **West Point.**

MILITIA (mĭ-lĭsh'ä), in the United States, a volunteer military force regularly trained, but not forming a part of the standing army. This force is spoken of usually as the *National Guard.* It is subject to the call of the President and serves to aid the executive to execute the laws, suppress insurrections, and repel invasions. All able-bodied male citizens who have attained to the age of 18 years, and have not reached 45, are in a certain sense a standing militia, since they are subject to military service under certain conditions. The militia force of Canada is about 46,000, but in case of war it can be expanded to 150,000. President Wilson called the militia of the United States into action in 1916, at the time of the invasion of Mexico, and again called this force in 1917, at the time the country entered the Great European War.

MILK, the whitish liquid secreted by the mammary glands of all female mammals for the nourishment of the young. It is an emulsion with a slight but pleasant odor and an agreeable, sweetish taste. Milk may be regarded a perfect food. It is consumed by the young mammal after birth, and enters largely into the food products essential to man. When subjected to microscopic examination, milk is found to consist of a clear fluid, in which minute globules are held suspended. Each of the globules appears as a separate body of oily matter enveloped by a thin coating of albumen. The globules rise toward the surface when the milk is at rest and form *cream,* the time required varying according to temperature. Under favorable circumstances about fourteen hours is required to accumulate practically all the cream. The milk may be agitated rapidly by churning, when the fat globules become broken and collect as butter in the form of a pasty mass. The milk of all mammals contains the same constituents, but differs considerably in the proportion in which they are present in each kind. The following table contains an exhibit compiled by Charles A. Doremus:

VARIETIES.	WATER.	SOLIDS.	FAT.	CASEIN.	MILK SUGAR.	ASH.	NITROGENIZED.	NON-NITROGENIZED.
Women	86.73	13.26	4.13	1.99	6.93	0.20	1.99	11.06
Cows	84.28	15.72	6.47	3.57	4.34	0.63	4.35	10.81
Goats	86.85	13.52	4.34	2.53	3.78	0.65	3.79	8.12
Ewes	83.30	16.60	6.05	7.73	3.96	0.68	5.73	10.01
Asses	89.01	10.99	1.85	3.57	5.05	....	3.57	6.90
Mares	90.45	9.55	1.31	2.53	5.42	0.29	2.53	6.73
Buffaloes	80.64	19.36	8.45	4.24	4.51	0.84	4.24	12.96
Camels	86.34	13.66	2.90	3.67	5.78	0.66	3.67	8.68
Sows	81.80	18.20	6.00	5.30	6.07	0.83	5.30	12.07
Hippopottami	90.43	9.57	4 51	4.40	....	0.11	....	.....
Elephants	66.69	33.30	22.07	3.21	7.39	0.62	3.21	29.45

For three or four days after giving birth the milk secreted by the mother is a yellowish fluid, has a strong alkaline reaction, possesses purgative qualities, and is called *colustrum.* Milk of this kind is not considered a commercial product, but is fed to the young, and after about four days it becomes suitable for domestic use. Cheese is prepared by separating the casein into curds, which is done by coagulating the milk by a rennet or other agents, the rich character of the cheese depending upon the presence of large numbers of fatty globules. The thin fluid remaining after the milk has been coagulated is called *whey* and the whitish deposits form the *curd. Buttermilk* is the remnant left after churning and removing the butter. Both buttermilk and whey are used as pleasant drinks. The *rennet* used in coagulating milk is made from the fourth stomach of a calf. The principal adulterant of milk is water, which is added to increase its quantity, and frequently salt, sugar, carbonate of soda, and other substances are added for the purpose of preventing the milk from turning sour.

Cow's milk is the only kind utilized in the United States and Canada for making butter and cheese. It is practically the only class of milk used in America for culinary purposes, but in many countries of Europe and Western Asia the milk of goats, ewes, camels, and buffaloes is used extensively. *Condensed milk* is made by adding a small quantity of sugar and evaporating it in vacuum pans to about one-fourth its ordinary bulk. Reduction takes place rapidly under a temperature of 140°. The sugar used is the preservative, which keeps the condensed milk wholesome, the proportion being about one and one-fourth pounds to the quart of condensed milk produced, and in using it the consumer adds a quantity of water. The production of milk is a vast industry, as is also the enterprise of furnishing the daily supply for the large cities. Strict regulations are now maintained in most cases whereby the consumer may feel assured that the cows producing the milk

are in good health and that the milk is supplied to them in a pure state.

MILK, Condensed. See **Milk.**

MILK SNAKE, or **House Snake,** the name of a snake common to many parts of North America, so called from the belief that it is fond of milk. Some think that it frequents the yards where cows are kept for the purpose of sucking the milk, and this view seems to be founded upon fact, though it is not often that this occurs. The color of the snake is dark gray above and yellowish beneath, and on its back are large blotches of black. The food consists chiefly of insects and mice, for which it frequents houses and barnyards. This snake is entirely harmless.

MILKWEED, any plant of the genus *Asclepias,* of the milkweed family, so called from the milky juice that exudes from a wound. Many species are included in the family of plants, of which about forty are native to North America. The seeds are clothed with a tuft of long silky hairs, which gives rise to the additional name of *silkweed.* In most species the flowers are white, orange, or purple in color. They are large and ornamental. In some countries the milkweed is cultivated as a garden or an ornamental plant. Some species bear fibers that are of value in making paper, others have silky tufts and are used with cotton in spinning, but most are nothing more than obnoxious weeds in farm lands. When firmly rooted in the soil, the common milkweed is not easily destroyed. The common milkweed is the most widely distributed in America.

MILKY WAY, or **Galaxy,** a great belt or zone of light stretching in a vast circle across the sky at an angle of about 63° to the equinoctial, extending from one horizon to the other. The Milky Way arises from the blended light of countless stars which appear as a diffused light to the naked eye, but, when viewed with a powerful telescope, myriads of stars densely crowded together are observed. The stars are not distributed uniformly through its entire extent, and each is doubtless a sun of some system of planets. William Herschel estimated that 250,000 stars passed through the field of his great telescope in 41 minutes. With the powerful instruments now in use it is probable that many more can be seen. Other names applied to the Milky Way are Jacob's Ladder and the Way to Saint James.

MILL, the name used originally to designate a machine for grinding grain so as to reduce it to flour or meal. The term is now applied to divers complicated machinery for treating various materials so as to render them suitable for use in manufacturing or for immediate consumption. Grain was ground originally by placing it between two flat stones and rubbing one roughly over the other by hand. From this fundamental idea of a nether and upper stone used by hand originated the building of mills and devices for grinding grain, but at present the machinery used is such that the grain passes between rollers and is crushed by pressure. The different mills now employed in manufacturing are variously designated according to their particular purpose, as flour, meal, spinning, weaving, cider, coffee, cotton, oil, fulling, planing, saw, bark, lapidary's, and other mills.

MILL, James, philosopher, born near Montrose Scotland, April 6, 1773; died June 23, 1836. He studied at the University of Edinburgh and became a preacher in the Church of Scotland. In 1802 he settled in London as an author, giving much of his time to writing in regard to affairs in India. He became assistant examiner for the East India Company, in 1819, and in the meantime contributed to the *Westminster Review.* His son, John Stuart Mill, was greatly aided by his writings on philosophy and political economy. Among his books are "History of British India," "Elements of Political Economy," and "Analysis of the Human Mind."

MILL, John Stuart, author and statesman, born in London, England, May 20, 1806; died in Avignon, France, May 9, 1873. His father, James Mill, is celebrated as a writer and philosopher and took a studious interest in the early education of his son. The son was skilled as a Greek student at a very early age, went to France in 1820 for the purpose of learning the French language, and in the meantime studied political economy at Paris. In 1823 he became a clerk in a government office in London, was soon made head of the examiners' department, and opposed the transfer of India, in 1858, to the crown. He became a member of Parliament in 1865 and acted with the Liberals. From a very early period in life he was known as an acute thinker and prolific writer, contributing to a number of periodicals. He was principal manager of the *Westminster Record* for five years, beginning in 1835, edited the works on law published by Jeremy Bentham (1748-1832) for a number of years, and wrote many treatises on political economy and logic, several of them still being standard text-books. His publications include "A System of Logic," "Essays on Political Economy," "Comte and Positivism," "The Subjection of Women," "Principles of Political Economy," "Thoughts on Parliamentary Reform," "On Liberty," "England and Ireland," "Utilitarianism," and "Three Essays on Religion." He made many addresses in favor of the equality of legal and political rights of women.

JOHN STUART MILL.

MILLAIS (mĭl-lā'), **Sir John Everett,** painter, born in Southampton, England, June 8, 1829; died Aug. 13, 1896. He descended from an ancient Jersey family, spent his youth in the Channel Islands, and in 1840 became a student at the Royal Academy, where he displayed rare ability and exhibited a number of highly artistic productions. At the age of seventeen he exhibited his historical painting, "Pizarro Seizing the Inca of Peru," and in 1847 secured a gold medal for his "Tribe of Benjamin Seizing the Daughters of Shiloh." His productions are beautified by excellent coloring and refinement of taste. They are much admired because of the nearness in which they approach to nature. Among his most celebrated works are "Christ in the House of His Parents," "The Boyhood of Raleigh," "Huguenot Lovers," "Autumn Leaves," "Over the Hills and Far Away," "Black Brunswicker," "Ferdinand Lured by Ariel," "The Woodman's Daughter," "Veil of Rest," and "Ophelia." He painted portraits of Gladstone, Tennyson, Carlyle, Salisbury, Bright, and Disraeli. In 1885 he was made a baronet, received the decoration of the Legion of Honor in 1878, and in 1896 succeeded Lord Leighton as president of the Royal Academy, but died the same year.

MILLER, Cincinnatus Heine, best known as Joaquin Miller, poet, born in Indiana, Nov. 10, 1841; died Feb. 17, 1913. In 1854 he removed to Oregon with his parents, where he spent his early life among the pioneers and Indians. For about five years he lived with the Modoc Indians, began the study of law, and in 1863 began to practice that profession in Oregon. Subsequently he became judge of Grant County, Oregon, which position he held from 1866 until 1870. Several of his poems were written while he was comparatively young. Later he edited the Eugene *Democratic Register*. He published his first volume of poems in London, England, where he assumed his pseudonymic name. His productions were favorably received by English critics and he was thus encouraged to follow a literary career. Some of his novels have been dramatized and have had successful presentation in various cities of Europe and America. Among his writings are "Songs of the Mexican Seas," "Songs of the Sierras," "Ship of the Desert," "First Families of the Sierras," "Songs of the Sunlands," "Songs of the Desert," and "The Danites."

MILLER, Hugh, author and geologist, born at Cromarty, Scotland, Oct. 10, 1802; died near Edinburgh, Dec. 26, 1856. He was largely self-educated, but studied for some time at the Cromarty grammar school, and during intervals was employed in the work of a stone mason. He published several poems in 1829; became editor of the *Witness* at Edinburgh in 1840, and gave much attention to the study of geology. His writings are not only pleasing to the reader, but contain many beautiful and valuable statements of facts. Among them are "Poems Written at Leisure Hours," "Legends of the North of Scotland," "Old Red Sandstone," "Footprints of the Creator," and "Story of My Education."

MILLET, a grass which is cultivated for its grains and for forage. The species are numerous, most of which bear stalks and leaves of value for feed in the green and dry state. The plants are wholesome as food products for cattle, sheep, horses, mules, and other domestic animals. Millet was cultivated by the ancients in the earliest times as a cereal, the seed being used as food by man. The *common millet* has a strong stem, about two to four feet tall, and produces a profusion of foliage. The seed is still used extensively for making flour and to be eaten as rice in Italy, Turkey, Arabia, China, Syria, and other countries of Europe and Asia. Millet seed is of value as food for poultry and cage birds. Some species are widely distributed as obnoxious weeds in crops, such as the *foxtail millets.* Among the cultivated species are the common millet, the sorghum millet, and the Hungarian millet, or Hungarian grass.

COMMON MILLET.
a and *b*, two views of the spikelet; *c* and *d*, two views of the "seed."

MILLET (mĭl'lĕt), **Francis Davis,** painter and author, born in Mattapoisett, Mass., Nov. 3, 1846. He graduated at Harvard University in 1869 and subsequently studied at the Royal Academy of Fine Arts in Antwerp, Belgium, and later in France and Italy. In 1877-78 he was war correspondent for the New York *Herald* and London *Daily News* and reported the principal engagements of the Russo-Turkish War, being an attaché to the staff of General Skobeleff. At the Chicago Columbian Exposition he was director of decorations. In 1898 he went to the Philippines as correspondent of *Harpers Weekly* and the London *Times.* However, he is better known as a genre and classic painter than as a writer. His best known works include the decoration of Trinity Church, Boston, "Between Two Fires," "At the Inn," and "A Cozy Corner." He died April 15, 1912.

MILLET (mē-yā'), **Jean François,** famous painter, born in Gruchy, France, Oct. 4, 1814; died at Barbizon, near Paris, Jan. 20, 1875. He

descended from a peasant family and spent the early part of his life as a farm laborer, but on account of his natural ability and taste for painting was sent to Cherbourg to study under Monchel. In 1849 he settled near the Fontainebleau forests, where he produced his marvelous works of beauty representing French peasant life. It is doubtful whether in the last century France produced a more original artist or one of greater skill. His great work, entitled "The Angelus," sold at Paris in 1889 for $115,000. Other noteworthy productions include "Peasant Grafting," "Sheep-Shearers," "Shepherdess with her Flock," "Women Carding," "The Sower," "The Gleaners," and "Waiting."

MILLIKAN, Andrew Robert, physicist, born at Morrison, Ill., March 22, 1868. He was educated in public schools and at Oberlin College, Oberlin, Ohio, and subsequently he studied in Germany. He was a professor at the University of Chicago from 1896 to 1921, after which he became the director of the Norman Bridge Laboratory of Physics at Pasadena, Cal. His fame rests chiefly on his research work of the atom and the isolation of the electron. In 1923 he received the Nobel prize in physics.

MILLS, Roger Quarles, statesman, born in Todd County, Kentucky, March 30, 1832; died in Texas, Sept. 2, 1911. After being admitted to the bar, he settled at Corsicana, Tex., to practice law. From 1859 until 1860 he was a member of the State Legislature. In 1872 he was elected as a Democrat to Congress, in which position he served until 1892, when he was elected to the United States Senate. He was chairman of the Ways and Means Committee from 1887 to 1889 and drafted the Mills bill, which became a law and constituted a celebrated tariff revision.

MILL SPRING, Battle of, an engagement of the Civil War, fought at Mill Spring, Ky., Jan. 19, 1862. The Confederates under Gen. George B. Crittenden made an attack upon the Federals under General Thomas, but were unable to drive their antagonists from the field. Each army consisted of about 4,000 men. This engagement is sometimes called the Battle of Fishing Creek. A national cemetery occupies the battle ground, in which 725 soldiers lie buried.

MILLVALE, a borough of Pennsylvania, in Allegheny County, on the Allegheny River, opposite Pittsburg. It is on the Pennsylvania, the Baltimore and Ohio, and other railroads, and has manufactures of ironware, lumber products, machinery, and stone products. Electric lighting, street railways, and waterworks are among the public utilities. Population, 1920, 8,031.

MILLVILLE, a city of New Jersey, in Cumberland County, on the Maurice River, forty miles south of Philadelphia, Pa. It is on the Pennsylvania Railroad and has communication by steamboats and electric railways. Among the chief buildings are the public library, the high school, the city hall, and many churches. Union Lake, situated near the city, is a fine sheet of water. The manufactures include cotton goods, glass, machinery, and canned fruits. It has systems of sanitary sewerage, waterworks, and street pavements. Millville was incorporated as a town in 1801 and became a city in 1866. Population, 1905, 11,884; in 1920, 14,691.

MILNER (mĭl'nĕr), **Sir Alfred,** public man, born at Bonn, Germany, in 1854. He studied in Germany and afterward attended King's College, London, and Baliol College, Oxford. Subsequently he studied law and in 1881 was admitted to the bar, but devoted himself to journalism and served on the staff of the *Pall Mall Gazette.* He was made private secretary to Mr. Goschen, Chancellor of the Exchequer, in 1887, and two years later became Undersecretary of Finance in Egypt. For five years he was chairman of the Inland Revenue Board, from 1892 until 1897, and in the latter year was appointed High Commissioner of South Africa and Governor of Cape Colony, serving in the former position during the second Boer War. In 1899 he held a personal conference with President Kruger, and subsequently was chairman of the commission that negotiated a treaty of peace. He was appointed Governor of the Transvaal and Orange River colonies in 1901, was created baron in the same year, and in 1902 was made viscount. He died May 13, 1925.

MILO, or **Milon,** a Greek celebrated for great physical powers, born about 525 B. C. It is reputed that he was the champion wrestler and athlete at the national games. After his various successful exploits, many challenges were extended to him, but none of his antagonists was able to meet him successfully in combat. According to accounts, he won ten Isthmian, nine Nemean, six Olympian, and seven Pythian games. After these successful contests, to demonstrate his great strength, he carried a live ox on his shoulders at the Olympic games. Later he saved the life of Pythagoras and his scholars by supporting a falling building. It is said that he was able to lift the iron gates of the city. The story is related that while endeavoring to pull a large tree apart his hands were caught in a split and that wolves devoured him while he was held fast.

MILREIS (mĭl'rēs), or **Milrea,** a coin and money of account used in Brazil and Portugal. It is divided into 1,000 *reis* and in Portugal it is known as the crown, or *corôa.* Estimated in the money of Canada and the United States, the milreis of Brazil is worth about 55 cents and that of Portugal is worth $1.08. The milreis is issued both in gold and silver.

MILTIADES (mĭl-tī'ă-dēz), noted general of Athens, born in the latter part of the 6th century B. C. His skill and bravery caused him to become the ruler of Chersonesus. Later he led a successful expedition against the Scythians and, at the time Greece was invaded by the Persians, he was selected as one of the ten generals

to resist the march into Attica. After deliberating whether the Grecians should venture a battle or defend the city from its walls, it was decided to take the former course and, when Miltiades commanded the Grecian hosts, he gained a memorable battle on the field of Marathon in 490 B. C. Soon after he persuaded the Greeks to permit him to command an expedition against the Persians, for which purpose a fleet of seventy vessels was placed at his disposal, and he immediately followed up his victory by attacking the Persians on the island of Paros, but he was repulsed with heavy losses and was severely wounded. The Athenians immediately impeached him and placed a fine of fifty talents upon him. Being unable to pay the fine, he was thrown into prison, where he died shortly after of a wound received in the battle. His son Cimon afterward paid the fine.

MILTON (mĭl'tŭn), a town of Massachusetts, in Norfolk County, on the Neponset River, seven miles south of Boston. It is on the New York, New Haven and Hartford Railroad and is an attractive suburb for the residence of many Boston business men. The chief buildings include the public library, the Milton Academy, the Leopold Morse Home, the townhall, and many schools and churches. It has manufactures of crackers, cement, chocolate, clothing, machinery, and granite products. An observatory and a station of the United States Meteorological Bureau is located near the place. Milton was settled in 1637 and incorporated in 1662. Population, 1905, 7,051; in 1925, 12,861.

MILTON, a borough of Pennsylvania, in Northumberland County, on the Susquehanna River, 66 miles north of Harrisburg. It is on the Pennsylvania Canal and on the Pennsylvania and the Philadelphia and Reading railroads. The noteworthy buildings include the high school, the public library, and several churches. It has a public park, brick and macadam pavements, and systems of waterworks and sanitary sewerage. The manufactures include leather, machinery, hardware, textiles, railroad cars, and farming implements. Milton was settled in 1770 and incorporated in 1817. Population, 1900, 6,175; in 1920, 8,638.

MILTON, John, eminent poet, born in London, England, Dec. 9, 1608; died Nov. 8, 1674. He descended from a noted Protestant family, was trained to industry from early childhood, and in 1625 entered Cambridge, where he studied about seven years. It was his desire to become a minister, but the disturbed condition of the church at that time caused him to retire to Horton, where he remained six years, laboring industriously as a student and writer of classical literature, mathematics, music, and philosophy. In 1637 he made an extended visit to various European countries, including France, Germany, and Italy, and in the last named country met Galileo and other famous men. On returning to England he took an active interest in the political controversy between Charles I. and Scotland, and in 1639 settled at London to assist in the education of his two nephews, the sons of Mrs. Phillips. In the meantime he began to sketch his "Paradise Lost."

JOHN MILTON

In 1643 Milton married the daughter of a royalist family, Mary Powell, but this lady soon found the austere home of the puritan cheerless and after a month returned to her father's home. Later she returned, and, after bearing three daughters, died in 1653. The execution of Charles I. in 1649 met the approval of Milton, who gave expression to his views in the pamphlet, "The Tenure of Kings and Magistrates," and was rewarded by Cromwell by an appointment to the office of Secretary of the Commonwealth. This position he held with eminent distinction until the monarchy was restored, and, after Charles II. ascended the throne, Milton lived in concealment until pardoned by a general amnesty. His eyesight began to fail rapidly and in 1652 he became totally blind. Subsequently his works were dictated to Andrew Marvell and to his daughters, who were illy prepared to do this important task in the Greek and Latin. In 1656 he married a second time, but his wife died fifteen months later, and in 1663 he entered for a third time into a marriage contract.

Milton's "Paradise Lost" was completed in 1663. This celebrated work was published in 1667, and by it Milton secured the reputation of being the greatest poet of his time. However, he received only $25 for the copyright and a like amount was paid to him at the sale of 1,300 copies of each edition. According to this contract, he received three payments and in 1681 his widow sold her rights to the work for $40. Other works published by Milton are "Paradise Regained," "History of Britain to the Norman Conquest," "Samson Agonistes," "Treatises on Divorce," "Treatise of Christian Doctrine," "Tractate on Education," and "Treatises of Reformation." Milton was a stately poet. He came in possession of his powers at an early age and his works have survived the centuries. His "Paradise Lost" has been read the most extensively. It has been translated into nearly all modern languages and has gone through hundreds of editions. His life was largely disturbed by domestic and political differences until his third marriage, when he was enabled to live serenely amid his friends and among books and music.

MILWAUKEE (mĭl-wą'kē), the largest city of Wisconsin, county seat of Milwaukee County, a port of entry on Lake Michigan. It is 85 miles north of Chicago, Ill., at the mouth of the Milwaukee River, which discharges into Milwaukee Bay. Two small streams, the Menominee and the Kinnickinnic, flow into the Milwaukee River within the city, which has a safe and spacious harbor. The site of the city is about 600 feet above sea level, rising from 80 to 130 feet above Lake Michigan, hence its location is sanitary and beautiful. The city occupies an area of about 35 square miles. It has regularly platted streets, most of which are substantially paved with concrete or asphalt, and they cross each other at right angles in nearly all parts of the city. The business section, situated a short distance from the lake, is well built and has many modern and substantial business and office buildings. A large number of bridges and viaducts span the rivers.

Description. The city hall occupies a triangular block a short distance from the county courthouse and the government buildings. The public library contains 650,000 volumes and has a number of branches to accommodate the patrons in the different parts of the city. A valuable art collection is located in the Layton Art Gallery, which was founded by public spirited citizens. Among the churches are many fine structures, and all the Christian denominations are well represented. The educational institutions include a branch of the University of Wisconsin, the Concordia College, the Marquette University, and the Milwaukee Downer College for women. It is the seat of a State normal school, two business colleges, and many fine public and parochial schools. A large part of the inhabitants are socially inclined, hence many musical and *Turner* societies are represented in the club and social life. The city is beautified by many fine avenues and public parks, the latter including about 1,000 acres. Lake Park is noted for its fine drives and beautiful scenery and is located along the lake shore in the northwest part of the city. In the western part is Washington Park, which contains many fine lakes and is the home of a large zoo. In Juneau Park, on the lake front, is a statue of Solomon Juneau, the founder of Milwaukee. Other public grounds include Riverside, Humboldt, and Kosciusko parks, all of which are noted as attractive resorts. The principal statues include those of Bergh, Washington, and Leif Ericson. Forest Home Cemetery is one of several fine burial places.

Industries. Milwaukee is important as a center of commerce and industry. It is the converging center of many trunk railways, by which it is connected with the chief cities of the United States. The principal lines include the Soo Line, the Chicago and Northwestern, and the Chicago, Milwaukee and Saint Paul railroads. Several of the lines have fine depots. It has additional transportation facilities by the Great Lakes, on which steamers ply regularly during the shipping season between it and the principal trade centers on these lakes, both in Canada and the United States. Large quantities of coal are unloaded at its docks, being shipped principally from points farther east. It is one of the great collecting and distributing centers of the northwest, having a large trade in farm produce and vast interests in jobbing and wholesaling. The manufactures include flour, machinery, leather, iron and steel products, boots and shoes, furniture, packed meat, and automobile accessories. It is one of the chief centers in America for the manufacture of leather goods, such as harness, saddlery, and upholstery. Many smelters are maintained, the iron ore being shipped to this city from Minnesota and the northern part of Wisconsin. As a market for lumber it has long held an important position. The total manufactures per year have an immense value. It is noted as a market for cereals, especially barley, oats, and wheat, large quantities of which are handled in its elevators. The slaughtering and meat-packing interests are likewise important.

Inhabitants. The population of Milwaukee were very largely of foreign descent, but those of German extraction were greatly in the majority. It had large interests in the publication of German newspapers and books, and formerly the German language was spoken more generally than any other tongue. At the time of the Civil War a number of companies were formed entirely of German citizens, but at present the population is American, however including also descendants of Poles, Bohemians, and Scandinavians. The total foreign-born population in 1900 was 102,646. In the same year the total population was 285,315 and in 1905 it was 312,948.

History. A number of French immigrants came to the present site of Milwaukee in 1790, when Jean Baptist Mirandeau built a log cabin. Solomon Juneau, the founder of the city, established a trading station in 1818, but the town was not platted until 1835. Originally the place was called Juneautown, which comprised a small village, and the name was changed to Milwaukee in 1837. Kilbourntown, on the west side of the river, was annexed in 1839, and Waker's Point and several other settlements were soon after incorporated with Milwaukee, which was incorporated as a city in 1847, when Solomon Juneau became the first mayor. Its rapid growth may be said to date from that year, when the railway and manufacturing interests began to develop. Population, 1920, 457,147.

MIMICRY (mĭm'ĭk-rў), a term applied in botany and zoölogy to an imitative resemblance of one plant or animal to another, or to some inanimate object, for which it may be mistaken. However, the term is applied most extensively in the animal kingdom. The phenomenon is thought to be entirely involuntary depending

particularly upon the conditions surrounding species of animal forms through many generations. This peculiar characteristic is one of the chief means of protection that some animals have, since they so nearly resemble the leaves or stalks of plants that their presence is not easily detected. In other cases the animals take advantage of this characteristic by quietly stealing upon their prey without being observed. Writers generally agree that mimicry occurs most commonly in animals which have been confined to the same country and practically to the same spot through many generations. Among the best examples of mimicry are those found in leaf insects, the walking stick, and many species of butterflies.

MINARET (mĭn'ă-rĕt), the slender tower constructed at the corners of a mosque. Some Mohammedan houses of worship have four or more minarets, and the large mosque at Mecca has seven. They are sometimes called light towers, from the circumstance that they are illuminated on the nights of feast days. They are constructed of brick or stone, usually polygonal or cylindrical, and have projecting balconies, from which the official, known as the *muezzin,* by the voice calls the people to prayer, instead of ringing a bell as is the custom in Christian churches. In the early history of Mohammedanism the mosques had no minarets. These towers were first erected in the 7th century. Some at Medina and in Constantinople, such as those of Saint Sophia, are graceful and form an ornamentation to the buildings. Ascent to the summit is made by a winding inner stairway, and most of those found in the more valuable buildings contain several stories and are crowned by a small dome or pinnacle. In height they vary greatly, from about fifteen feet to several hundred feet. The minaret of the Hassan Mosque of Cairo, Egypt, is 280 feet high.

MINAS (mē'năsh), or **Bello Horizonte,** a city of Brazil, capital of the state of Minas Geraes, sixty miles northwest of Ouro Preto, with which it is connected by railway. It is surrounded by a fertile farming country and has manufactures of clothing, machinery, and cotton and woolen goods. The streets are broad, well paved, and improved by sewerage and electric lighting. It has a public library, a Federal court and post office building, and several fine parks. Minas was founded in 1894 and the capital was soon after removed to it from Ouro Preto. Population, 33,680.

MINAS BAY (mī'năs), or **Basin of Minas,** an inlet from the Bay of Fundy, extending into Nova Scotia a distance of sixty miles. The inlet is properly divided into three parts, known as Minas Channel, Minas Bay, and Cobequid Bay. Minas Bay receives the inflow from the Avon River, which flows into it from the south. On its southern shore is the village of Grand Pré, famous because of its mention in Longfellow's "Evangeline." The tides rise very high in Minas Bay, sometimes from fifty to seventy feet.

MIND, a term employed to designate the entire psychical being of man, by virtue of which he is able to think, feel, and will. When used in this wide sense, the different powers of the mind are divided into three general classes: the intellect, the sensibility, and the will. The *intellect* comprises those powers by which we are able to know, the *sensibility* is that group of powers by which we feel, and the *will* is the power to choose and execute. Man is made up of mind and matter. We are equally unable to know the real constituents of mind or matter, but it is possible to study both by their effects and their relations to each other. Although we know nothing of human minds disconnected from bodies, yet many writers hold that the mind is a real thing, and that it does exist after the body is dead. It is certain that the mind and body are closely related and that manifestations purely mental, such as fear, joy, and anger, have a marked influence over the body. On the other hand, the conditions of health and disease have an equal influence in invigorating or weakening mental activity.

The science that investigates mental phenomena is called *psychology,* though sometimes it is spoken of as *mental science,* and, in a certain sense, as *metaphysics.* Among the differences noted between mind and matter are that the former manifests itself only by its acts, while matter manifests itself only by its qualities. Matter never moves unless acted upon by some force, but mind originates its own activity. We cannot conceive of matter without realizing that it occupies space, while mind cannot be said to occupy space. Mind is characterized by consciousness, but there is no evidence that consciousness is found in matter. Mind has the power to know its own acts, and it alone knows the qualities of matter. Some writers regard animal mind as imperfectly corresponding with that of man, while others think that the lower animals have a sensitiveness and sensation correlated with impulse and retentiveness, and that it is also modified by animal emotions and affections.

MINDANAO (mĕn-dă-nä'ō), one of the largest of the Philippine Islands, next in size to Luzón. It is situated in the southern part of the Philippine Archipelago, is about 300 miles from north to south, and has an area of 36,237 square miles. The general outline is irregular, the coast containing many important inlets, among them Sarangani, Illana, Iligan, Davao, Butuan, and Sibuguei bays. Large portions of the interior are mountainous, but there are fertile valleys and extensive coast plains. The volcano Apo is among the highest peaks, being 10,312 feet above sea level. It has extensive forests of valuable timber, a diversity of mineral wealth, and several lakes, including lakes Mindanao, Malanao, Ligauasan, and Kabatuan. The

products consist largely of lumber, live stock, cotton, coffee, cocoa, tobacco, sisal, and many varieties of fruit. Formerly the Spaniards occupied the northern part, while the other portions were under a Sultan. The inhabitants consist largely of Malays, Chinese, Japanese, and descendants from the Spaniards. Zamboanga, Surigao, and Butuan are among the principal towns. Population, 1922, 501,364.

MINDORO (mĕn-dō′rō), an island of the Philippines. It is separated from Luzón by Verde Island Passage. The area is 3,108 square miles. It is about 115 miles long and 50 miles wide. It is of volcanic origin. The coast line is quite regular and the surface is mountainous. It has a hot climate and an excessive rainfall. Among the products are lumber, iron ore, live stock, rice, sisal, tobacco, cereals, cinnamon, and fruits. Mount Halcon has an elevation of 8,865 feet above sea level. Calapan, situated on the northern coast, is the capital and principal seaport. The inhabitants consist largely of Malays and Mongolians. Population, 1922, 107,486.

MINERALOGY (mĭn-ĕr-ăl′ō-jў), the science that treats of minerals. The chief purposes of this branch of study are to point out the various means whereby to ascertain the chemical composition and the physical characters of inorganic substances, to classify them according to their specific relations, and to examine the manner in which they occur, together with substances associated with them, with a view of securing a comprehensive and systematic classification. Mineralogy is interested in treating of all inorganic substances found within the earth or on its surface. While geology treats of the constitution of the earth's crust and examines the history of the different strata or deposits, mineralogy investigates the separate constituents found in the crust of the earth and classifies their properties as separate constituents. It was known in comparatively early periods that simple and distinct minerals constitute the crust of the earth, but extended investigations were not made until in the 16th century.

Mineralogy is divided into various departments, including crystallology and physical, chemical, determinative, descriptive, and economic mineralogy. *Crystallology* treats particularly of mineral crystallization; *physical mineralogy,* of the cohesive, elastic, optical, electric, lustrous, and other physical features of the different species; *chemical mineralogy,* of the chemical properties; *determinative mineralogy,* of the special crystallographic, physical, and chemical methods of distinguishing species; *descriptive mineralogy,* of the classification and description of species with their associative minerals and geographical distribution; and *economic mineralogy,* of the uses of minerals in the arts, as for jewelry and various purposes of manufacture.

Among the discoveries leading toward the classification of well-defined characteristics of minerals were those of Nicolaus Steno, of Denmark, who, in 1669, announced that in crystals of quartz the angles of inclination of joining faces are constant and that, even if the size varies, the number of faces and their groupings were always the same. The double-refracting property of Iceland spar was observed in the same year. The Arabians had designated quartz as *crystal,* meaning clear ice, but Robert Boyle, in 1672, showed that it is more than twice as heavy as an equal bulk of water and that ice is lighter than an equal bulk of that liquid. Among the discoveries of the 18th century are that the various shapes of crystals of the same product are intimately related, that ten forms of crystallization are the true primitive forms from which all others can be derived, and that there is a relationship in the structure of crystals between the secondary planes and the primitive form. Prof. Weiss, of Berlin, in 1809 announced the discovery of fundamental lines, which he called *axes,* and showed a relationship between the primitive forms and the secondary planes. His system includes four axial groups of crystallization. Later other systems of crystallization were worked out by the use of the reflective *goniometer,* an instrument employed to measure the angles between the faces of crystals.

The intimate relation that exists between the cleavage form of a mineral and its action upon light was pointed out in 1819 by Brewster, and, accordingly, he made a classification of crystals on optical grounds, which agrees with that of Weiss with the exception of two of the systems. From these discoveries the present six natural systems of crystallization generally recognized by writers were established, and these are held to include all possible crystal forms. Early in the study of mineralogy the classification was divided into earths, stones, and metals. Werner, in 1817, classified the different minerals as earthy, saline, combustible, and metallic. Much diversity of opinion still prevails as to the causes that produce minerals of different grades of hardness, but always after their own crystallized form, and also in the classification of the minerals as to their different properties.

Among the various characteristics that have led to the different classifications may be named *luster,* the light reflected from the surface; *streak,* the appearance of a furrow when cut by a hard instrument; *fracture,* the peculiarity of the surface when freshly broken; and *hardness,* the resistance to an attempt to cut or scratch the mineral. Mohs, a German mineralogist, originated a scale by which the various minerals were graded as to hardness from one to ten. A representative exhibit according to this scale may be given as follows: 1, talc; 2, gypsum; 3, calcite; 4, fluorspar; 5, apatite; 6, potash feldspar; 7, quartz; 8, topaz; 9, corundum; 10, diamond. When seeking to classify a mineral as to hardness, the experimenter will ascertain which of the above it will scratch. A mineral

that will scratch quartz but not topaz, while it may be scratched by the latter, is classified in relation to hardness between 7 and 8.

Pseudomorphism is a peculiarity that occurs in nature from alteration through chemical change, as by loss, addition, or exchange of constituents. In that case the mineral is called a *pseudomorph,* since it possesses the external crystalline form of another mineral. This phenomenon likewise occurs by molecular change; by substitution, either partial or total, as when the original crystal is dissolved out and the cavity filled by other material; and by superficial incrustation. In such instances the hardness is often different, the luster is absent or dull, and the weight is unlike that of the mineral simulated in form. Among the examples of pseudomorphism may be named petrified wood, which is formed by infiltrating the wood with water containing silicic acid, and, as the wood is dissolved away, the silica is substituted. Another example is found in cases where animal forms become buried and their molds are afterward filled by a mineral taking on the form common to the peculiar animal covered by the deposits. The list of famous mineralogists includes Mohs, Werner, Haüy, Agricola, and Dana. The last named writer is considered authoritative in the determinative mineralogy of America.

MINERAL WATER, a designation applied to the water of springs and wells which contains in solution an unusual proportion of sulphur, iron, sodium, magnesia, carbonic acid, etc. Mineral waters usually result from subterranean currents passing over deposits of iron, salt rock, sulphur, alkaline, and other mineral substances, thus dissolving and carrying with them a certain per cent. of mineral matter.

MINERAL WOOL, or **Silicate Cotton,** the threadlike filaments produced in blast furnaces by the action of steam or air under pressure upon slag when in the molten state. The slag is driven by pressure through an aperture, forming, when cooled suddenly, long filaments that appear like wool or cotton. Mineral wool is used as covering for boilers and steam pipes, being a nonconductor of heat, and serves as an effective barrier to the transmission of sound. It is particularly valuable for these purposes because insects find in it nothing to eat.

MINERVA (mĭ-nĕr'vȧ), the Roman goddess representing wisdom, identified with the Pallas-Athene of the Greeks. She is represented as the daughter of Jupiter, and was regarded the patroness of learning and of useful arts. Schools were under her especial care. To her were ascribed the invention of musical instruments and accomplishments in spinning, weaving, sewing, and other household arts. She protected warriors in battle. Her aid was implored by physicians, painters, and teachers. In statuary she is commonly represented with a spindle, spool, and needle. The only three divinities worshiped in the Roman capital were Jupiter, Juno, and Minerva, and in their joint honor the *ludi maximi,* or great games, were held. The Minerval festivals occurred from the 19th to the 23d of March.

MINING, the art of conducting operations by which useful minerals are obtained from the earth's crust. The art of securing metals and other minerals of economic value either upon or underneath the surface has been practiced from remote antiquity. It is thought that turquoise mines were worked in the peninsula of Sinai as early as 3000 B. C. Tubal Cain is mentioned in Genesis as "an instructor of every artificer of brass and iron," and Job refers to mining and metallurgy. In the museum at Turin, Italy, is an Egyptian papyrus dating from 1400 B. C. in which a plan of gold mining is depicted. The Phoenicians are mentioned by Herodotus as being engaged extensively in mining in the mountains of the island of Thaso. They operated in other regions and carried on a large trade in tin and lead. The Romans conducted extensive silver mining at Almaden, Spain, while they had possession of that portion of the Iberian peninsula. They had extensive mining interests in Britain, of which evidences still remain. Georgius Agricola, a Latin writer, published the first exhaustive treatise on mining in 1556. In 1620 gunpowder was introduced for blasting rock, which was soon followed by a complete revolution in the art of conducting mining for different minerals. The steam engine began to be employed in the 18th century. In 1815 the Davy lamp was invented, which has been of immeasurable utility in coal mines. Subsequently the methods of conducting the art as well as many new forms of useful machinery came into common use.

Mineral deposits occur in various forms, but they are usually classified under the two divisions known as *seams* or *strata,* and *lodes* or *veins.* The seams occur principally in horizontal deposits, as coal, iron ore, and salt, and they are parallel to the stratified rocks that are immediately below and above. Seams occurring in a nearly perpendicular form are due most generally to disturbances by earthquakes or volcanic action, the strata being thereby disturbed and set up more or less vertically. Lodes comprise mineral matter that was in a molten state and by internal pressure oozed out and completely filled a fissure that existed in the crust of the earth, gold and silver deposits often occurring in this manner. A large number of methods of prospecting for minerals are in use, although many of the rich veins and seams were discovered by mere accident. Gold was found in California by cutting a mill race and in Hungary by accidentally observing a bird picking up shining particles. However, there are localities in which the minerals project at the surface and in that case there is little difficulty in beginning operations. This is true particularly

of coal, which is often found projecting at hillsides, and of gold and silver lodes, but in the latter form the portions near the surface are not productive and extensive excavations need to be made to ascertain the general value of the lode to be developed. Where mineral deposits exist far below the surface, as is the case in coal and other deposits, it usually is deemed advisable to do prospective boring for the purpose of ascertaining the value and depth of the deposits, determining whether there are extensive water-bearing strata, and ascertaining whether the strata of rock immediately above the deposits will constitute a safe and durable roof.

In prospecting it is found profitable to use a diamond drill, and the operator keeps a careful memoranda of the exact composition of the various formations through which the drill passes. If paying quantities of mineral deposit and suitable conditions are found to exist, a trial shaft is sunk down to the depth at which the minerals are found. In excavating it is often necessary to employ powerful explosives for the purpose of penetrating through rocks, which is usually the case in most mines, particularly where it is sought to develop lodes. Shafts are commonly sunk through one or many hundred feet of valueless formations before reaching the mineral deposits. The method depends entirely upon the formations to be penetrated, but there is usually a plan of hoisting the loosened particles by horse or steam power. In such cases devices are used for properly ventilating the particular place occupied by the workmen, and safeguards are employed against an influx of excessive quantities of water. The latter is usually effected by water-tight boxes, but in larger enterprises by artificially freezing the water-bearing strata. The whole subject of mining is divided into four lines of study: mining geology, mining engineering, metallurgy, and mechanical engineering.

Mining is a more or less dangerous and unhealthful occupation, but with modern methods of performing the labor and ventilating the various departments of the mine it has become much more wholesome and agreeable. Two different methods of operating in strata are usually employed, especially in coal mining. The one is known as the *pillar and room* method, in which the roof is sustained largely by pillars of coal left for that purpose, while in the *long-wall* method, sustaining pillars of coal are left only near the shaft, and farther back the roof is sustained temporarily by props of wood, but later these are removed and it is allowed to settle down consecutively as the miners excavate the coal. Long-wall mining is by far superior in all cases where the conditions are favorable, since the settling roof causes the coal to break down as soon as it is undermined by the laborer or by a machine, and it is possible to utilize practically the entire deposit. Where the pillar and room method is employed the roof is borne up by pillars and wooden props, and in some cases it is possible to remove the pillars before abandoning the works, but often much of these are lost and usually the expense of blasting the coal is greater. The different waste materials are generally used to fill the portions from which the coal has been removed. The methods of operating in veins bearing metals are quite different from those common in coal mines, since the deposits are found most frequently in lodes running slightly inclined from the vertical, or they occur in deposits of great thickness.

The size and depth of collieries differ greatly, as do also the methods of securing the ores, but it is generally aimed to utilize all the parts bearing sufficient value to be stamped and smelted, while the portions representing a value not sufficiently profitable are made use of, at least in some cases, for filling in excavated portions. Drills propelled by compressed air, steam, or electricity are used extensively, but in the smaller mines hand-drilling is universal. When the drill holes have been properly made, the explosives are placed into them and connected by fuse, and the opening is properly tamped by clay or some other agency. After all the necessary matters have been adjusted, the fuse is lighted, and the laborer steps to a place of safety until the explosion occurs. The amount loosened by a single explosion depends entirely upon the kind of mineral, its thickness, and the manner in which the explosive has been applied. Among the different agencies employed are blasting powder—which is still used largely in coal mines—gunpowder, gun cotton, dynamite, and nitrated gun cotton. In some mines electricity is utilized to fire the charge.

As above stated, many of the mines are operated with the level of the surface, or even some distance above the lower part of a hill, but the largest amount of mining is done far below the surface. A silver-lead mine at Przibram, Bohemia, has a depth of 3,435 feet and was long the deepest shaft in the world. The Calumet Copper Mine in the Lake Superior region of Michigan is 3,900 feet deep, and one in Prussia is 5,830 feet deep. The vast expense in building a shaft of great depth makes it necessary to hoist a large quantity of mineral products at one opening, but this is accomplished readily by use of modern hoisting machinery especially adapted for deep-mine working, the speed in many of them ranging from 3,500 to 5,000 feet per minute. Vast improvements have likewise been made in mine drainage, the use of compressed air and electricity, machinery for ventilation, and the treatment of ore products after they are brought to the surface.

The mining industry of the world is of vast importance, adding largely to the wealth of the nations annually and employing millions of workmen. Many of the leading countries of the world support schools and institutions de-

voted to disseminating knowledge of mining, thus placing the industry on a high and recognized basis of efficiency. The labor unions have tended to bring the workmen in connection with each other as sympathetic coöperators, and thereby to increase their efficiency and knowledge of economic questions. The mining industry of Canada and the United States is of growing importance and yields vast quantities of all important minerals. Among the chief products are pig iron, bituminous coal, silver, anthracite coal, gold, copper, petroleum, lead, natural gas, zinc, brick clay, lignite coal, salt, aluminum, granite, phosphate rock, fire clay, borax, quicksilver, slate, marble, mineral paint, and mineral waters.

The minerals found on lands which belong to individuals are owned generally by the parties holding titles, but lands known to be mineral and whose title is still in the government may be preëmpted only by persons actually operating, for a nominal fee. In many countries all mineral titles are vested in the government, but in others absolute titles are given. Usually the quantity of mineral land that may be held is limited to a small tract, while certain rights are given to follow veins that lead into the possession of a neighboring claimant. In 1848 much excitement was occasioned by the discovery of vast gold fields in California. This was true also of Alaska and Yukon, where valuable discoveries were made in 1897. The leading schools of mining in the United States include the Stevens Institute of Technology at Hoboken, N. J.; the Sheffield School in Yale University; and the School of Mines, in Columbia College, New York City. The School of Mining at Kingston, Ontario, is affiliated with Queen's University and is the leading institution of the kind in Canada.

MINISTER (mĭn'ĭs-tẽr), an officer who is intrusted with the administration of national affairs, or one who exercises the chief directions of any department in a state. The persons who constitute the administration in many countries of Europe are collectively called the ministry or the cabinet. In countries like England, where only nominal executive power is vested in the crown, the Prime Minister is selected by the sovereign, while other members of the ministry are chosen by the Prime Minister. In Germany, Japan, and the republics of America the ministers are not responsible to the legislative department, but are chosen directly by the chief executive. The policy of the government of Great Britain is directed by the Cabinet of nineteen ministers, but the ministry proper includes, besides the members of the Cabinet, a number of undersecretaries, who are members of Parliament.

The delegates or representatives of a government to a foreign country are called ministers and are usually distinguished by the term *foreign ministers.* All independent states may send ministers to and receive from any other sovereign state ministers to treat of affairs concerning both states. These ministers are divided into three classes, according to the powers vested in them. An *ambassador extraordinary,* who occupies the highest rank, personally represents his state or sovereign. With this class are included the legates and nuncios of the Pope. The ministers of the second class are known as *envoys extraordinary, ministers plenipotentiary,* and *internuncios,* and the degree of their power and distinction is not equal to that of the former class. *Envoys, ministers, resident* and *chargés d'affaires* belong to the third class. *Consuls* are interested chiefly in matters of commerce. Those known as *agents,* or *residents,* represent the chief executive or his subjects in matters of a private character. Ministers sent by two nations to settle a dispute at a court or congress of a third power, or where several governments are interested, are known as *ministers-mediators. Commissioners* are representatives who are sent to settle disputes concerning territorial limits or the exercise of judicial functions.

MINK, the common name of several fur-bearing quadrupeds, allied to the polecat. Several species are native to America, Europe, and

EUROPEAN MINK.

Asia. The fur is a beautiful chestnut-brown, the tail is bushy, and the body is stouter than that of the weasel. It is from fifteen to eighteen inches long, including the tail, which is about nine inches. Minks have well-developed scent glands, and the secretion is almost as offensive as that of the skunk. The common American mink is found chiefly along ponds and streams, where it pursues a semiaquatic life and preys upon fishes, crawfishes, frogs, and small mammals. It is hunted for its fur. Minks are commonly caught in traps, but some species have a rare intelligence in avoiding capture.

MINNEAPOLIS (mĭn-nē-ăp'ō-lĭs), the largest city of Minnesota, county seat of Hennepin County, at the Falls of Saint Anthony, on the Mississippi River, immediately above Saint Paul. The eastern limits coincide with the western limits of Saint Paul, with which it is connected by many railroad and electric railway lines, and the intervening space between the two centers is occupied chiefly by residences, educational institutions, and industrial establishments. The two municipalities are popularly called the Twin Cities. A number of railways from the east and south have their termini in the city, including the Chicago and Northwestern, the Chicago Great Western, the Chicago, Rock Island and Pacific, the Chicago, Burlington and Quincy, the Soo Line, the Minneapolis and Saint Louis, and other railroads. It has direct connections with the Pacific coast by the Northern Pacific, the Great Northern, and the Chicago, Milwaukee and Saint Paul railways.

Description. The city is divided into unequal portions by the Mississippi River, which is crossed by eighteen bridges. The Falls of Saint Anthony are in the center of the manufacturing district and supply an abundance of water power, and below them the Mississippi flows through a deep, rocky gorge. In some parts the site is gently rolling, while in others it is quite level, but all of it is more or less sandy, hence is easily improved for drainage and communication. Nearly all of the streets cross each other at right angles, and many of them are substantially paved with granite, asphalt, and wood blocks. The river divides the city into what is known as the East and West divisions, and both of these are divided into north and south sections. The West Division is the larger and is divided by Hennepin Avenue, and the East Division is divided by East Hennepin Avenue and Central Avenue. From these dividing lines, to which the north and south streets run parallel, the avenues are numbered east and west, while the streets running north and south are numbered in order from the river. The manufacturing and wholesale districts extend up and down both sides of the river, while the chief business streets for retailing are a short distance south of the Falls of Saint Anthony, especially on Nicollet and Hennepin avenues and the adjacent streets south of Washington Avenue.

Parks and Lakes. Minneapolis is located about 800 feet above sea level. Within the city limits are are a number of beautiful lakes, including Lake Harriet, Lake Calhoun, Lake of the Isles, and Cedar Lake. These lakes are surrounded by a boulevard that extends toward the south and east, connecting them with the fine drives along the Mississippi, Minnehaha Falls, and Fort Snelling. These lakes are connected by canals, making it possible for small boats and gasoline launches to pass from one lake to the other. Lake Minnetonka, the source of Minnehaha Creek, lies about 12 miles west of Minneapolis, and is celebrated for its beautiful resorts, summer homes, and yacht clubs. About 130 parks are maintained, comprising an area of approximately 4,735 acres. Minnehaha Park, a tract of 138 acres, contains the Falls of Minnehaha and adjoining this park are the Longfellow Gardens. Loring Park is near the center of the city and immediately west, across the street, is a large open space for games and out-door sports. This is known as The Parade and was donated to the city by the late Thomas Lowry. Riverside Park, one mile below the Falls of Saint Anthony, is a beautiful ground on the river bluffs. The State Soldiers' Home occupies a tract of 60 acres adjoining Minnehaha Park.

Buildings. Many of the buildings are modern in architectural features and are constructed of steel and granite, or of steel and concrete. The county courthouse and city hall, erected at a cost of $3,125,000, is built of Minnesota granite. The library, a Romanesque structure, contains 447,700 volumes and an art gallery. The University of Minnesota, one of the largest educational institutions in the United States, is located in the southeastern part of the city. The public school system includes 89 graded and 15 high schools and has a reputation for efficient and systematic instruction. Among the educational institutions are the Lutheran Augsburg Seminary, the Northwestern Conservatory of Music, and a number of private educational and charitable institutions. The larger buildings include the Masonic Temple, the Chamber of Commerce, the Dykeman and Radison hotels, the Lumber Exchange, the Armory, the Auditorium, Metropolitan Life Building, the Andrus Building, the New York Life Insurance Building, the Security Bank Building, and the West High School. All of the leading Christian denominations are well represented. The larger churches include the First Baptist, the Westminster Presbyterian, the Fowler Methodist, the Plymouth Congregationalist, the Christian Scientist, the First Unitarian, the Orthodox Greek Catholic, the Swedish Tabernacle, the Saint Mark's Episcopal, and the Church of the Immaculate Conception. The Roman Catholic Basilica of St. Mary's, founded in 1907, is one of the largest and finest ecclesiastical structures in the northwest.

Industries. Minneapolis has splendid water power facilities at the Falls of Saint Anthony, where are located the largest flouring mills in the world. The output of flour of all the mills is 80,175 barrels daily, and the product is shipped to the leading commercial centers of America and Europe. Timber products are next of importance, but the output has decreased on account of a diminution in the timber area of the north, whence large quantities of logs are rafted down the Mississippi. The manufacture of boots and shoes, farming machinery, furniture, underwear and knit goods,

bags, doors, canned goods, and clothing yields large returns. It has extensive grain elevators and is the largest primary grain market in the world. The city has many wholesaling and jobbing houses, supplying a large scope of country with merchandise and manufactured products. This is made possible by its extensive network of railways and interurban lines. Transportation on the Mississippi, though abandoned for some years, is showing a marked revival.

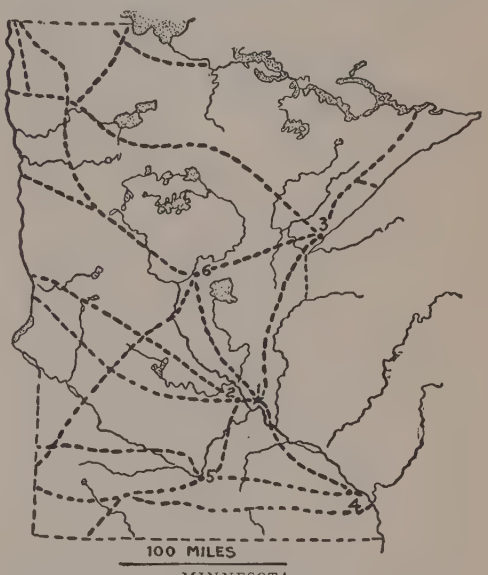
HISTORY. The vicinity was first visited by Father Hennepin in 1680, when he discovered and named the Falls of Saint Anthony. In 1819 the United States government erected Fort Snelling at the mouth of the Minnesota, when the present limits of Minneapolis were included in the military reservation surrounding that fort. The first mill of large size was built in 1822 and settlements were made soon after on the lands adjoining. In 1856 the town was incorporated as Minneapolis and it became a city in 1867. Its early growth was due to the extensive milling interests. For a long time there was a rivalry with Saint Paul, but it surpassed that city in population about 1900. A large part of the inhabitants are of foreign descent, this element including principally Scandinavians. Population, 1905, 261,974; in 1920, 380,582.

MINNEHAHA (mĭn-nĕ-hä'hä), a small river of Minnesota, the outlet of Lake Minnetonka and other lakes, flowing into the Mississippi between Saint Paul and Minneapolis. In this stream are the celebrated Falls of Minnehaha, which constitute a sparkling cascade falling from a height of 58 feet. The vicinity has been beautifully improved as a park. Longfellow applies the name Minnehaha, meaning *laughing water,* to the principal female character of his "Song of Hiawatha."

MINNESINGERS (mĭn'nĕ-sĭng-ẽrz), the name for a class of German poets who were popular in the higher grades of society from 1138 until 1347. They were so named from the Old German, the name meaning *singers of love.* It was their custom to write poetry and compose music devoted to love and devotion, and to visit the different castles and courts of princes and nobles. Fully 175 writers of note are represented in the productions of this period that are still extant. They include the excellent works from which Wagner drew inspiration in writing his compositions, among them being the "Nibelungenlied" and "Lohengrin." They likewise include the famous "Wachtlieder," in which splendid romances of praise and watch incidents are recited. After their decline came the Meistersangers, an order of men belonging to the artisan class, who formed guilds by binding themselves to observe certain arbitrary laws of rhythm. Nuremberg became the center of their guilds, whence they spread rapidly to all German-speaking countries, and the last of their guilds at Ulm was not discontinued until 1839. Their poetry was largely lyrical and was sung to music. The most celebrated of the guild was Hans Sachs, who composed 4,275 songs.

MINNESOTA (mĭn-nĕ-sō'tä), a river of Minnesota, which has its source near Lake Traverse, on the western boundary, and then widens into Big Stone Lake, a sheet of water about thirty miles long. After flowing from that lake, it passes Ortonville in a southeasterly direction, makes a bold curve near Mankato, and thence flows northeast into the Mississippi River near Saint Paul. The Minnesota has a total length of 460 miles. It is navigable about one-fourth of its course, and flows through a region possessing much agricultural wealth.

MINNESOTA, a north central state of the United States, the most northerly of the Union, popularly called the *Gopher State.* It is bounded on the north by Manitoba and Ontario, east



MINNESOTA.

1, Saint Paul; 2, Minneapolis; 3, Duluth; 4, Winona; 5, Mankato; 6, Brainerd. Chief railroads shown by dotted lines.

by Lake Superior and Wisconsin, south by Iowa, and west by North Dakota and South Dakota. The western boundary is formed largely by the Red River of the North; the northern, by the Lake of the Woods, the Rainy Lake River, and Rainy Lake; and the eastern, by Lake Superior and the Saint Croix and Mississippi rivers. The length from north to south is about 400 miles, the breadth from east to west is from 240 to 300 miles, and the area is 83,365 square miles, including a water surface of 4,160 square miles.

DESCRIPTION. The surface is generally an undulating plain with an average elevation of about 990 feet above sea level. Through the north central part extends an elevated plateau, known as the Height of Land, which has an elevation of 1,750 feet above the sea. From it the drainage is generally toward the southeast, but north of it the slope is toward the basin

of the Nelson River. In the northeastern part is the Mesaba Range, located northwest of Lake Superior, where the highest summits are 2,200 feet. From the lowland in the vicinity of Lake Superior, where the altitude is about 600 feet, the surface rises to the Mesaba Range, whence it declines to the Mississippi basin, and then rises gradually toward the southwestern part, where the Coteau des Prairies have a general altitude of 1,800 feet. Along the rivers and streams are rolling lands, which have fine belts of timber, but practically all of the soil is fertile. In the northwestern part is the valley of the Red River of the North, which has a level surface, and level tracts characterize the lake region in the north central part.

The Mississippi River and its tributaries drain the larger portion of the State. This stream rises in Elk Lake and has a general course toward the southeast. Its chief tributaries include the Saint Croix, the Crow Wing, the Minnesota, and the Zumbro rivers. The Otter Tail River drains a number of lake basins in the west central part and discharges into the Red River of the North at Breckenridge, on the western border. The northeastern part is drained chiefly by the Saint Louis River, which discharges into Lake Superior at Duluth. Several small streams in the north, such as the Big Fork and Vermilion rivers, flow into Rainy Lake and Rainy Lake River, and the Rock River drains the southwestern corner through the Big Sioux into the Missouri. The State has about 10,000 lakes, ranging in size from ponds to beautiful and extensive sheets of water. The largest of these is Red Lake, which discharges through Red Lake River into the Red River of the North. Other lakes of considerable size include Mille Lac, Leech, Otter Tail, Minnetonka, Vermillion, and Winnebigoshish. Traverse and Big Stone lakes, the sources of the Bois de Sioux and the Minnesota respectively, are located on the western border. Many of the lakes are noted as summer resorts. They are skirted by timber and yield many species of edible fish.

Minnesota, being near the geographical center of North America, has a continental, temperate, and healthful climate. The winters are cold and the summers are hot, but the warm days are usually followed by cool nights. In the northern part the temperature averages about 10°, in January, and the mean temperature for July is 70°. There is a difference of about ten degrees in the temperatures in the north and the south. At Saint Paul the thermometer falls to 18° below zero in winter, and at the same place it rises to 95°, or even 100°, in the summer. All parts of the State have an abundant rainfall for the germination and growth of crops, ranging from 20 inches to 30 inches in the southeast, with an average of 29.3 inches for the entire State. Some sections have a heavy fall of snow.

Mining. The State has the largest iron mines in the world, and the output is over half of the entire production in the United States. Although iron was known to exist in the Mesaba and Vermillion ranges as early as 1860, no material progress was made in the developments of mining the ores until in 1884. The mean annual production at present is about 32,500,000 long tons. A very large part of the output is shipped from Duluth and Two Harbors to smelters located in the cities on the lakes, principally in Illinois and Ohio. Valuable deposits of granite are worked at Ortonville, Saint Cloud, and other points in the State, and brown sandstone is obtained in Pipestone County. Clays of value in the manufacture of brick and pottery are widely distributed, and slate for commercial purposes is quarried in the northern part of the State. Deposits of pipestone occur in Pipestone County, where it was quarried to some extent by the Indians for making pipes of peace. Other minerals include corundum, red jasper, and feldspar.

Agriculture. Minnesota is noted as an agricultural State, and for many years has taken high rank in the production of certain crops. It holds third place in the acreage and yield of spring wheat, second in the production of barley, and third in that of oats, though in these respects it is closely approximated by several of the states. Hay and forage crops rank high in yield and acreage. Corn is grown extensively in the southern part, where the climate is exceptionally favorable to the growth of that cereal. Other crops grown extensively include hay, flax, rye, potatoes, and sugar beets. Small fruits, such as raspberries and currants, yield abundantly, and many species of plums and apples are grown for the market.

The State has large interests in raising cattle, both for meat and dairy products. It has a reputation for its fine grade of horses, which are grown to a large extent for the market. Other live stock includes swine, sheep, mules, and angora goats. Poultry of all kinds is grown profitably.

Manufactures. The manufacturing enterprises have advanced materially the last two decades, both in the number of enterprises and in the aggregate of their output. These results have been obtained through its convenience in shipping facilities, both by railways and by transportation on the Great Lakes. Minneapolis, Saint Paul, Stillwater, and Duluth are the largest railway and manufacturing centers of the State. Another factor in the development of the manufacturing industry is its extensive water power, such as has been developed through the improvement of the Falls of Saint Anthony, at Minneapolis, and various places in the channels of the Mississippi, Saint Louis, and Pelican rivers. Flour and grist milling products comprise the largest item of manufactures, in which the State exceeds all others in the Union. Lumber and timber products also hold high rank.

This condition is due to a large acreage of forests, about 50,000 square miles, including spruce, pine, oak, maple, cedar, poplar, tamarack, and other species. Formerly half of the lumber was sawed at Minneapolis, when it was transported to that place by rafting on the Mississippi. At present the lumber-milling interests are distributed more generally throughout the northern part of the State. The State produces large quantities of packed meats, butter and cheese, paper and pulp, canned milk, linseed oil, building stone and monuments, boots and shoes, railway cars, furniture, farming machinery, and clothing.

TRANSPORTATION AND COMMERCE. Navigation is restricted to the Mississippi and the Great Lakes, the former furnishing a water route to the south and the latter to the east. However, Lake Superior furnishes the most important waterway, hence Duluth has developed into one of the great shipping centers of the country. The development of mining is dependent to a great extent upon transportation by water, but cereals and lumber are likewise conveyed in large quantities by the route of the Great Lakes. Numerous trunk railway lines cross the State from east to west, furnishing ample facilities for transportation to Chicago and points east as well as to Canada and the Pacific coast. All of the counties in the southern part have railway conveniences, but a few in the northern section are sparsely settled and are not well supplied with transportation facilities. Saint Paul, Minneapolis, and Duluth are the chief railway centers. The lines aggregate a total of 8,750 miles. Electric railways are operated from many of the cities to suburban and interurban points.

The commerce of the State is very extensive owing to the fact that Minneapolis and Saint Paul are wholesaling centers and supply many parts of the northwest with manufactures of various kinds. Iron ore, grain, and lumber are shipped in large quantities from Duluth, and flour, lumber, and manufactures are distributed extensively from Saint Paul and Minneapolis. Clothing, coal, and food products are the principal imports.

GOVERNMENT. Minnesota is governed under a constitution which was adopted in 1857. The executive authority is vested in the Governor, lieutenant governor, secretary of State, treasurer, and attorney-general, all of whom are elected for two years, and the State auditor, who is chosen for four years. A superintendent of public instruction, appointed by the Governor for two years, has general supervision of the schools. The Legislature consists of a senate and a house of representatives, the former having 63 and the latter 119 members. Senators are elected for four and representatives for two years. They convene in the regular session of the Legislature biennally on the Tuesday after the first Monday in January. The State is divided into judicial districts, in each of which one or more judges are elected by popular vote for a term of six years. These courts are subject to the supreme court of five judges, who are elected by the voters of the State. Each county has a probate court, and the townships have justices of the peace. The county and township officers are elective.

EDUCATION. The statistics for 1926 show that the State has 7,798 school districts, including those known as common, independent, and special. These contain 8,649 schools, presided over by 20,795 teachers. A *common* district is controlled by a board of three members; an *independent,* by one of six; and a *special,* by one of six or more. The schools of common districts are supervised by a county superintendent; independent and special districts have their own superintendents and, in the main, are not subject to the county superintendent. Schools are classified as rural, semigraded, graded, and high; the last two coming under the State high school board, a body of five members, including the president of the State University, the superintendent of public instruction, and the president of the State normal board. The six normal schools are located at Saint Paul, Winona, Mankato, Saint Cloud, Moorhead, and Duluth. They are controlled by a board of nine, five of whom are resident directors. The University of Minnesota, situated in Minneapolis, is under the control of a board of twelve regents.

The public schools are supported by direct tax upon the property of the school districts, by a county one-mill tax, by a State mill tax, and by the income from the permanent school fund (amounting to $30,000,000), with small fines accredited to it. In addition to these funds, the State distributes annually to such schools as reach a prescribed standard of excellence: $100 to second-class rural schools, $150 to first-class rural schools, $300 to semigraded schools, $600 to graded schools, and $1,750 to high schools. The State encourages the establishment and maintenance of school libraries by annual appropriations, aiding each district with a sum equal to that raised in the district itself for library purposes, not exceeding $20 on original and $10 on subsequent orders. The normal schools are supported by appropriations of the Legislature. On the other hand, the university is maintained by a direct tax upon all the State property, special State appropriations, and aid from the Federal government. The State provides a fund for teachers' institutes and training schools, and out of this fund about 38 such schools are held annually, with an enrollment of over 5,000 teacher students. In addition, summer sessions of twelve weeks are held at each of the State normal schools. Examinations for professional certificates intended to represent a work of a full four years' college course are held twice each year; examinations for teachers' State certificates are held semiannually in each county of the State.

The School of Agriculture of the University of Minnesota is situated on a tract of 250 acres, at Saint Anthony Park, and is one of the best in the world. Two subexperiment stations are maintained in the northern part of the State. Besides these schools supported and controlled by the State, there are about fifty private colleges and academies. These include Gustavus Adolphus College, Saint Peter; Carleton College, Northfield; Shattuck School, Faribault; Hamline University, Hamline; Macalester College, Saint Paul; and Augsburg Seminary, Minneapolis.

The State maintains hospitals for the insane at Fergus Falls, Rochester, and Saint Peter, and has schools for the blind, deaf, and feeble-minded at Faribault. A State public school for dependent children is located at Owatonna and a State training school is maintained at Red Wing. The State prison is at Stillwater and Saint Cloud has a reformatory for criminals between the ages of sixteen and thirty years.

Inhabitants. A large per cent. of the people are of foreign birth, or the direct descendants of foreign-born parents. Those born in foreign countries consist largely of Germans and Scandinavians, these including nearly one-fourth of the population. The Lutheran and Roman Catholic churches predominate. Other Christian denominations represented largely include the Methodists, Baptists, Presbyterians, and Congregationalists. Saint Paul, on the Mississippi River, is the capital. Other cities include Minneapolis, Duluth, Winona, Stillwater, Mankato, Saint Cloud, Red Wing, Faribault, and Brainerd. In 1900 the State had a population of 1,751,394. This included 4,959 Negroes and 9,182 Indians. Population, 1905, 1,997,401; in 1920, 2,386,371.

History. Minnesota was formed partly from the Northwest Territory and partly from the Louisiana Purchase. The region was first visited by French traders and priests in 1659. Duluth built a fort at the mouth of the Pigeon River, on the northern shore of Lake Superior, in 1678 and Hennepin discovered the falls of Saint Anthony two years later. The northeastern part was ceded by France to England in 1763 and was acquired by the United States in 1783. All of the section lying west of the Mississippi was secured from France in 1803. The first settlement was founded at Fort Snelling, near the mouth of the Minnesota River, in 1821. Other settlements followed soon after at Saint Paul and Stillwater. The Chippewa Indians surrendered the lands east of the Mississippi River in 1837. In 1849 it was organized as a Territory, but embraced the northern part of the region now included in the present state of North Dakota and South Dakota. Later it became a part of the Territory of Missouri and afterward of Iowa, and in 1858 was admitted as a State. The Sioux Indians raised a formidable revolt in 1862, when about 800 persons were killed. Within the last several decades the State has made remarkably progressive strides in education and industries. It is increasing rapidly in wealth and developing in educational and political influence.

MINNESOTA, University of, a coeducational institution of higher learning at Minneapolis, Minn., founded by the Territorial Legislature in 1851. It was reorganized in 1860 and dates its real foundation from 1868, when it was again reorganized. A limited amount of instruction of a very elementary nature was provided at first, as early as the fifties, and a private school was held for some time in the unfinished university building. It is endowed by the general government, having received 186,569 acres of land, of which 34,603 acres remain unsold. These lands have yielded a permanent endowment of $2,406,796 and eventually the sum will be increased to not less than $20,000,000.

The university is made up of colleges, schools, and departments, including the college of science, literature, and the arts, the college of engineering and mechanic arts, the school of mines, the school of chemistry, the college of education, the department of agriculture, the dairy school, the college of law, the department of medicine, the college of homeopathic medicine and surgery, the college of dentistry, the college of pharmacy, and the graduate school. It is supported by funds received as the income from the permanent endowment, from fees, from the United States government, from a State tax levy, from direct State appropriations, and from sales and miscellaneous sources, making a total of $2,189,450. The university has 40 buildings valued at $9,036,000. It is governed by a board of twelve regents, three ex-officio and nine appointed members, the former including the Governor, the president of the university, and the State superintendent of public instruction. Both the museum and the herbarium are extensive. The general library contains nearly 450,000 volumes. On the grounds is a statue of John S. Pillsbury, who was long a regent and a benefactor of the institution. Degrees have been conferred upon about 9,900 persons. It has a faculty of 886 and an attendance of about 10,000 students.

MINNOW (mĭn'nō), a class o fish allied to the carp, found abundantly in the streams of America and Europe. They are common in the same streams with trout, swim in schools, and prefer gravelly bottoms. Most species have an average length of three inches, but some attain fully five inches. They are caught easily in hand nets for the purpose of serving as bait in catching other fish. In some regions minnows are known as *pink* and in some localities as the *minim*. The common minnows have a brown color, a protractile mouth, and small transverse bands of a darker shade of brown along the sides.

MINORCA (mĭ-nôr'kȧ), one of the Balearic Islands, in the Mediterranean Sea. It is second in size only to Majorca, and is situated about

25 miles northeast of the latter. Minorca has a length of thirty miles, is ten miles in width, and has an area of 403 square miles. The coast is rocky and precipitous and the interior has a number of mountains. Mount El Toro is the highest peak, elevation 4,985 feet. The island is productive, yielding flax, wheat, hemp, wine, copper, lead, iron, live stock, marble, and tropical fruits. Ciudadela and Point Mahon are the principal towns. Minorca has belonged to Spain since 1802. Population, 1922, 39,784.

MINOR PROPHETS, the twelve prophets of the Old Testament that are so named from the brevity of their writings, whose prophecies are recorded in the Hebrew canon. These prophets are Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah, and Malachi.

MINOS (mī'nŏs), a personage mentioned in Greek mythology as a ruler of Crete, the son of Zeus and Europa, and brother of Aeacus and Rhadamanthus. His reign became celebrated on account of its justice and moderation. After his death, he was created one of the judges of the lower world, which office he held in conjunction with one of his brothers.

MINOT, county seat of Ward County, N. D., 100 miles north of Bismarck, on the Mouse River, and on the Great Northern and other railroads. The surrounding country produces coal, wheat, flax, and live stock. It has flour mills, machine shops, and a large wholesale trade. The features include the courthouse, city hall, high school, public library, federal buildings, and many churches. It has sanitary sewers and electric lights. Population, 1925, 12,245.

MINOTAUR (mĭn'ō-tạr), a fabled monster described in Greek mythology as an individual having the body of a man and the head of a bull. He was made captive by Minos in the wonderful labyrinth constructed by Daedalus for the Cretan king. His imprisonment was brought about because he fed on human flesh, and while there was fed by criminals, but later youths and maidens were sent as tribute from Athens. Subsequently he was slain by Theseus and Ariadne.

MINSK (mĕnsk), a city of Russia, capital of the government of Minsk, 110 miles southeast of Vilna, on the Svislotch River. Minsk was important as a Polish city, but became a part of Russia in 1793. Many of the buildings are of stone. Population, 1921, 101,824.

MINT, the common name of any one of several aromatic herbs of the mint family. They include many species, such as *peppermint,* useful in medicine as a stimulant; *spearmint,* used in cooking; and *horsemint, mountain mint,* and *catmint.* Most of these plants are perennial. They are distributed widely in temperate regions, have square stems and simple and opposite leaves, and yield an essential oil. The flowers consist of whorls or circles grouped together, are purple or red in color, and possess a peculiar odor. Peppermint is used extensively in flavoring confectionery.

MINT, an institution for coining money, from which it is issued for circulation by public or sovereign authority. In early times the coins were made by cutting pieces of metal and hammering them into shape, but in the 16th century it became common to coin both gold and silver by melting, and, after mixing with it copper alloys, to cast it into molds of proper form. Antoine Brucher, a French engraver, was the inventor of the first coining machine similar to those now in use. The process involves mixing copper alloy to supply sufficient hardness to the gold or silver, which is done by melting the metals, and afterward these are cast into bars. The bars are then rolled to form sheets of proper thickness, suitable to have the coins cut from them. If, on weighing, the coins are too heavy, small strips are cut from the edges, but, if too light, they are remelted and again rolled. The result after cutting is a blank coin, which is taken to the milling machines, where the rim is completed, and afterward the figures and letters of the different coins are stamped on with the coining press. The finished coin is carefully inspected and weighed, and, if found in strict accord with the coinage requirements, it is placed with others of the same denomination in bags and stored in vaults until put into circulation.

The first mint in North America was established at Philadelphia under a national coinage act passed in 1792. At first the metal and machinery employed were imported. Copper money was coined at this mint as early as 1792, silver money in 1794, and gold money in 1795. Steam power was introduced in the coinage of money in 1816, and soon after branch offices were established at different places, both for assaying and coining metals. The royal mint of Canada is under the direction of the Deputy Master, who is assisted by the Superintendent of Coinage. Mints are maintained in the United States at Philadelphia, New Orleans, San Francisco, and Carson City, all of which are under the charge of the Bureau of the Mint of the United States Treasury Department. The establishment at Philadelphia is the most important, where the dies for all the mints are made. Assay offices are maintained in Denver, New York, Seattle, Helena, Deadwood, Saint Louis, and several other cities. Their purpose is to receive deposits of gold and silver, which are formed into bars and stamped with their weight and proportion of the metals, and then are returned to the depositor.

MINTO (mĭn'tō), **Gilbert Elliot,** statesman, born in England, July 9, 1847. He studied at Eton and Trinity College, Cambridge, and became an ensign in the Scots Guards. In 1877 he took part in the Turkish War and two years later commanded in the war against Afghanistan. He was made private secretary to Lord Roberts at Cape Town in 1881, and the follow-

ing year served as a volunteer in the Egyptian campaign. In 1898 he became Governor General of Canada, serving until 1904, when he was made Viceroy of India. He died at Harwick, England, March 1, 1914.

MINUIT (mĭn'ū-ĭt), or **Minnewit, Peter,** founder of New York, born in Wesel, Germany, about 1580; died in 1641. He descended from a Protestant family of distinction and for some time served as deacon of the Walloon Church of his native town. In 1625 he was appointed director general of New Netherlands and as such served under the Dutch West India Company. He came to America in 1626 and purchased Manhattan Island of the Indians for sixty guilders, and about the same time built Fort Amsterdam. His government of the colony was vigorous and energetic, but he was recalled in 1631. In 1637 he founded Fort Christopher, now Wilmington, Del., under the auspices of the Swedes. This colony remained independent until 1665, when it was annexed by the Dutch to New Netherlands.

MINUTE (mĭn'ĭt), a space of time and a division of angular measurement. As a space of time it is equal to the 60th part of an hour and is divided into 60 seconds. As a division of angular measurement it is the 60th part of a degree. To distinguish the two measurements, the former is called a minute of time and the latter a minute of arc, 15 minutes of arc being equal to one of time. Four minutes of time are equal to a degree.

MINUTEMEN, the name of the volunteer soldiers of New England in the American Revolution, who were pledged to take up arms on a minute's notice. An act of the provincial congress passed in 1774 authorized the enrollment of such members as a military force, and a considerable number of them took part in the battle at Lexington, the first engagement of the war.

MIOCENE (mī'ō-sēn), a term applied in 1835 by Sir Charles Lyell to the geological beds which were formerly called the Middle Tertiary. It is used to denote that only a minority of the shells belong to recent species, while Pliocene designates the more recent. Miocene deposits contain fossils of mammals, plants, and shells that foreshadow the life forms of the present time. They indicate a moderate climate.

MIÖSEN (mē-ö'zẹn), or **Mjösen,** the most important lake of Norway, in a fertile valley, 37 miles northeast of Christiania. The surface is 1,050 feet above the sea. It is eight miles wide and sixty miles long. The overflow is carried into the Glommen by the Vormen River. Near its shores are several railroad towns.

MIQUELON (mē-k'-lôn'), an island off the southern shore of Newfoundland, in the Atlantic Ocean. See **Saint Pierre.**

MIRABEAU (mē-rà-bō'), **Honoré Gabriel Riquetti, Comte de,** author and statesman, born at Bignon, near Nemours, France, March 9, 1749; died April 2, 1791. He descended from an ancient Florentine family, whose members were expelled from their native city on account of the Ghibelline political affairs in 1268, and whose descendants became prominent in French politics under Louis XIV. and Cardinal Mazarin. His father induced him to join the army, but during leisure moments he utilized his time in prosecuting study in various branches, and showed a disposition to follow a career of sensationalism. Smallpox had scarred his face to a remarkable degree, and he possessed a homeliness that became a power of influence when connected with his personal magnetism and intellectual strength. After serving for some time in the army, he fled with a married woman, but was apprehended and condemned to be executed as a deserter. During an imprisonment of about three years he wrote an essay on state prisons and several works of minor importance. Subsequently he was liberated, and, after spending some time in Holland, returned to France to become a candidate, in 1785, for admission to the National Assembly. In the first contest he was defeated, but later was chosen to represent Marseilles, and soon developed a wide influence by superior talents and admirable oratorical powers.

Mirabeau led a strong opposition against the court and the aristocracy, and sought to establish a constitutional monarchy in France. To accomplish these ends he endeavored to make the king head of the Revolutionary party, and afterward sought to form alliances with Necker and Lafayette by suggesting them for the new ministry. Later he tried to win the queen as a supporter, but his power was either doubted or his plans were distrusted to an extent that made effective operation impossible. In 1790 he became president of the Jacobins, and the following year he was made president of the National Assembly. In both these positions he displayed energy and boldness in advocating constitutional rights, and continued to endeavor to guide the Revolution so as to bring about reforms in peaceful ways, but soon after began to decline in mental and physical strength. The remains of Mirabeau were buried in the Pantheon with much pomp. His writings include several works on finance and political economy and a history of the Prussian monarchy under Frederick the Great. His son, Lucas Montigny, wrote his biography.

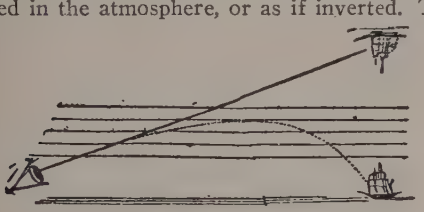
MIRABILITE (mĭ-răb'ĭ-līt), a white crystalline substance commonly known as Glauber's salts, valuable as a cathartic. It was first discovered at Carlsbad, Bohemia, by Johann Glauber (1604-1668), a German chemist.

MIRACLE (mĭr'à-k'l), an act wrought by divine power. At present miracles are not thought necessary to show the divine will of God, because we may learn of it in the Scriptures, or they are explained as the result of divine power operating under laws entirely nat-

ural but unknown to us. Among the notable miracles recited in the Scriptures are those mentioned in Exodus as the work of Moses, while he was endeavoring to persuade the King of Egypt to allow his people to emigrate, and those mentioned in the four gospels as directly exhibited by Jesus. Christ specifically explains the object of miracles by saying: "The works that I do bear witness of me, that the Father hath sent me."

MIRACLE PLAYS, a class of dramatical entertainments whose subjects were drawn from the lives of saints and from the Bible, and which were performed in the Middle Ages. Plays of this character were given as early as the 4th century in the churches by or under the direction of clergymen, but later stages were built in public places of cities on which they were exhibited in public as a means to disseminate religious instruction. Ultimately the miracle plays became corrupted by jests or partook rather of an entertaining than an instructive aspect, on account of which they were abolished for irreverence. The Passion Play is a noted example and is still performed at Oberammergau, Germany, and elsewhere with much success and good moral results. See **Mysteries.**

MIRAGE (mē-räzh'), an optical illusion in which images of distant objects are seen as if raised in the atmosphere, or as if inverted. The



MIRAGE.

illusion was first explained by a Frenchman who accompanied Napoleon I. on his expedition to Egypt. He was induced to investigate the phenomenon that appeared in the Egyptian desert, which was the source of much annoyance to the French soldiers, who were in several instances led to believe that a lake was really near them, when in fact they were deceived by illusionary images of water. The phenomenon is now known to be due entirely to the rays of light being changed in their direction when passing through colder or hotter strata of air. The layers of air in contact with the surface of deserts become greatly expanded and rarefied, while those immediately above remain more dense, thus causing the rays of light to be bent upward. However, the effect above water is usually the reverse, the layers above being warmer than those next the water.

The phenomenon is often seen in the form of one object over another, apparently raising objects above the horizon. It usually appears in a vertical form, but sometimes the images are horizontal. When an object appears to be lifted above its true position, as is shown in the figure, the phenomenon is called *looming,* and the observer is enabled to see the object, though it really is below the horizon. In looming objects appear either in an erect or inverted position. The difference between looming and mirage is that in the former the reflection is from the sky, while in the latter it is from the surface of the earth. The *Fata Morgana* is a remarkable phenomenon which appears frequently in the Straits of Messina, and presents objects in the air and at other times in the water. In 1822 Captain Scoresby was sailing in the polar regions and observed in the air the mirage of his father's vessel, which he afterward found to be thirty miles off. The instances of seeing ships, armies, men, trees, streams, and other objects apparently near the surface, or at some distance in the air, are very numerous.

MIRAMICHI (mĭr-ȧ-mē-shē'), a river of Canada, in New Brunswick. It is formed by two branches and, after a course of 150 miles, discharges into the Bay of Miramichi, an arm of the Gulf of Saint Lawrence. It is navigable for a distance of forty miles from its mouth. Along its banks are fine forests of pine. It has salmon and trout fisheries.

MIRAMÓN (mē-rȧ-mōn'), **Miguel,** Mexican soldier, born in the city of Mexico, Sept. 29, 1832; executed June 19, 1867. He descended from a French family, took a course of instruction at the military academy in Chapultepec, and helped to defend that position against the United States army in the Mexican War. In 1852 he entered the army and rose rapidly in rank, becoming general in 1857. He supported the ecclesiastical party against President Alvarez, and succeeded in defending the city of Puebla against a large besieging army. In 1859 he declined an election to the presidency in favor of Zuloaga, who had been deposed from that office, and, after being defeated in a battle against the liberals, fled to Europe in 1860. While there he advocated foreign intervention in Mexican affairs, but later returned to Mexico and gave vigorous support to Maximilian I. as reigning sovereign. It was largely by his persuasion that Maximilian thought it best not to resign, and, after the capture of Miramón by the republican forces, he was shot along with Emperor Maximilian at Queretaro.

MIRIAM (mĭr'ĭ-ȧm), a personage mentioned in the Scriptures as the sister of Moses, who watched over the cradle of her brother. When the latter was placed in a basket, she is mentioned as coming in contact with the daughter of Pharoah. After crossing the Red Sea, her fame as a prophetess and singer of triumphal songs is recounted. She was stricken with leprosy for complaining against the marriage of Moses with a Cushite woman, but later the malady was removed by the prayer of Moses. Miriam died near the close of the pilgrimage and was buried at Kadesh. Josephus states

that she was the wife of Hur and the grandmother of Bezaleel, the architect who designed the tabernacle.

MIRROR (mĭr′rẽr), any glass or polished substance which forms images by the reflection of rays of light. In ancient times mirrors were made of thin polished bronze, either fitted with a candle or encased in a wooden or metallic frame. The Romans made mirrors of polished silver and later of glass, but they were usually of small size and were carried in the pocket or at the girdle. Those carried in the pocket consisted of small circular plaques of polished metal fixed in a circular box, covered with a lid. In the early part of the 16th century A. D. mirrors began to be used as household furniture and decoration. They were not introduced into England until 1673, but they soon became an important article of manufacture in that country and in the colonies of America.

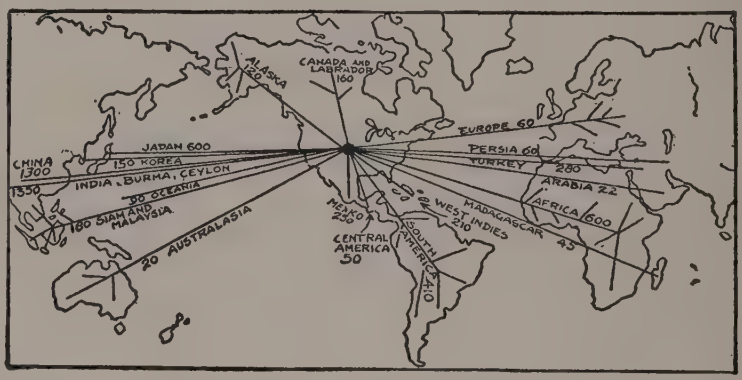
Mirrors are of various forms, but are usually classed as plane, concave, and convex. A *plane* mirror has a plane reflecting surface. When an object is placed before a plane mirror, a virtual image of it can be seen by an eye placed in the proper position, since the image of an object is in the direction from which the directed rays come. The size of the image corresponds to that of the object and appears to be as far behind the mirror as the object is away from it, but the sides are reversed. That is, in looking into a mirror, the observer faces the reflecting surface, hence the left side is seen at the right hand of the image. Two or more persons, looking into a mirror, see different images.

A *concave* mirror has a concave surface, similar to the concave side of a lamp reflector, and the surface may be either a part of a sphere or a paraboloid. The reflection of a concave mirror, when it is brought in contact with parallel rays of light, is at a point called the *focus*. The focus is directly opposite the center of the mirror and at a point in front of it. Several kinds of images are reflected by such a mirror, as may be observed by experimenting with a common lamp reflector. When the object is at the center of the curvature, the image is real, of the same size as the object, and at the center of curvature, but it is inverted. If the object is at a definite distance beyond the curvature, the image is real but smaller than the object, and it is likewise inverted. When the object is between the center of curvature and the principal focus, the image is larger than the object and inverted. The *convex* mirror is made from the section of the outside of a sphere. In such a mirror the reflected rays must be prolonged behind the mirror before they meet, hence the image is erect and smaller than the object. Small hand mirrors are usually made slightly convex.

MISHAWAKA (mĭsh-à-wą′kà), a city of Indiana, in Saint Joseph County, five miles east of South Bend. It is on the Grand Trunk (Western Lines), the New York Central, and other railroads, and is surrounded by a farming and fruit-growing country. The chief buildings include the high school, the city hall, and a number of churches. Settled in 1828, it is one of the oldest towns in northern Indiana and was incorporated in 1834. Among the manufactures are machinery, flour, farming implements, cigars, and earthenware. Population, 1920, 15,195.

MISSAL (mĭs′sąl), a book which contains the services of the mass for the various days of the week, used by the Roman Catholic church. At an early period of that church the several parts of divine services were arranged in different books, but these were later gathered into a collection. Pope Pius IV. commenced a revision that was finally completed and published under Pius V. in 1570. Later revisions were made under Clement VIII. in 1604 and by Urban VIII. in 1634. At the beginning of the missal now in use are a number of explanations and tables of the moveable feasts. These are followed by the service for the Sundays and greater festivals, by the proper of saints, and so on for the various days of the year.

MISSION (mĭsh′ŭn), a term used to designate a station at which missionaries make their headquarters for the purpose of disseminating religious doctrines and winning converts to the faith. The apostles were enjoined by Jesus to preach the gospel and became the first teachers of Christianity. Their work was taken up by many Christian teachers and missionaries, who caused the religion of Christ to spread to the various parts of Western Asia, Northern Africa, and Southern Europe. Under Constantine, in the 4th century, the firm establishment of Christianity was made a concern of the civil



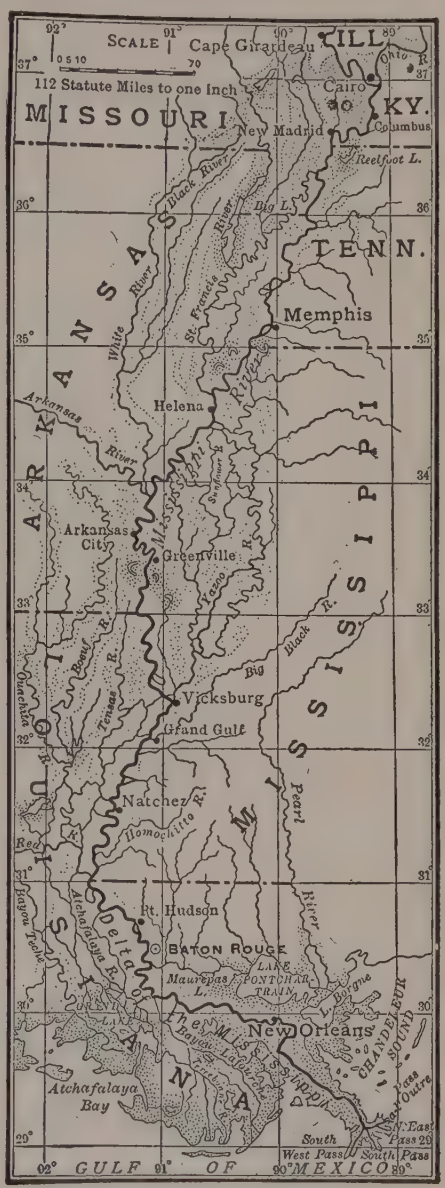
DISTRIBUTION OF AMERICAN FOREIGN MISSIONS.

power and under Charlemagne, in the 9th century, the Saxons became converted. The faith spread rapidly to the various Germanic tribes, who soon sent missionaries into Hungary, Poland, and the Scandinavian countries. The order of Jesuits was established in the Roman Catholic Church in the 16th century, and this order founded missions in South America and Eastern Asia. Later the Dominicans, Franciscans, and other orders were organized, under whose direction institutions of learning and industry were instituted.

During the 16th and 17th centuries the Protestant churches attained to a vast membership, and they sent their ministers and missionaries into all parts of the world. At present missionaries of all the Christian churches are operating in every inhabitable portion of the earth, and large sums of money are spent annually for the purpose of evangelizing heathen nations. Many important missionary societies are maintained in Canada and the United States, such as those of the American Baptist Union, American Board of Commissioners of Foreign Missions, Methodist Episcopal Missionary Society, Lutheran Missionary Union, and Presbyterian Board of Foreign Missions. Besides these are organizations known as home missionary societies, whose aim is to prosecute religious reform work within the home country. The Protestant churches alone have about 575 missionary societies, of which the largest numbers are in North America and Great Britain. Missionary unions to promote foreign and domestic evangelistic work are now maintained in practically all the countries of Europe.

MISSISSIPPI (mĭs-ĭs-sĭp′pĭ), meaning great water, or the *Father of Waters,* one of the largest rivers in the world. The source is in the north central part of Minnesota, where it issues as a small stream from Elk Lake. It passes through Lake Itasca and a number of others, and thence has a general course toward the south until it flows into the Gulf of Mexico. The entire length of the Mississippi is 2,625 miles, while the Missouri River has a length of 2,920 miles before reaching the Mississippi, hence the combined length of the two rivers is about 5,545 miles. The whole area drained by the Mississippi system is 1,600,000 square miles. It constitutes the most fertile and valuable region in the world. At Minneapolis are the Falls of Saint Anthony, which furnish immense water power, and here, as elsewhere, navigation is obstructed, but in many places vast improvements have been made by canals and levees, the latter being maintained to protect portions of the valley from overflowing during high water. The regions subject to overflow are situated south of Saint Louis, where it becomes a vast stream of rapidly moving water and carries large quantities of sediment to the gulf. Among the principal eastern tributaries are the Wisconsin, the Illinois, the Ohio, and the Yazoo. The western confluents include the Minnesota, the Des Moines, the Missouri, the Arkansas, and the Red rivers.

At its source the Mississippi is only a few feet wide, but at the mouth of the Ohio it is



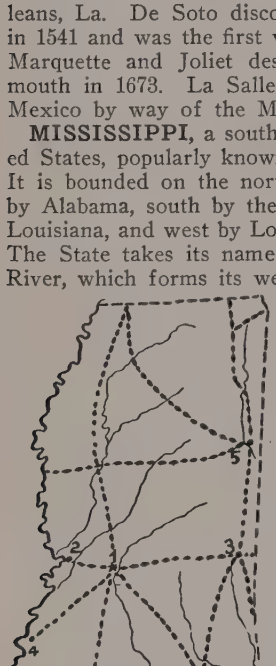
LOWER MISSISSIPPI VALLEY.

4,700 feet and at New Orleans it is 3,100 feet, while the maximum volume of water per second during a flood is estimated at 1,500,000 cubic feet. The sediment transported annually is sufficient to cover a square mile to the height of 250 feet. In the upper course the water is clear and transparent, but it gradually grows

dark with silt, which it deposits. During the past ages it has carried the land surface far into the Gulf and formed a large number of bayous and islands. The government of the United States has caused the construction of jetties to protect the channel for the passage of vessels.

The Mississippi River and its tributaries furnish about 16,000 miles of navigable waters, which make possible a vast inland commerce by steamboats. Numerous canals connect the various rivers and lakes near them, the most important of recent construction being the connection between Lake Michigan and the Mississippi by the Chicago Drainage Canal. Among the important cities on the Mississippi River are Saint Paul and Minneapolis, Minn.; Dubuque, Davenport, Burlington, and Keokuk, Iowa; Rock Island, Quincy, Alton, and Cairo, Ill.; Saint Louis, Mo.; Memphis, Tenn.; Vicksburg and Natchez, Miss.; and Baton Rouge and New Orleans, La. De Soto discovered the Mississippi in 1541 and was the first white man to reach it. Marquette and Joliet descended nearly to its mouth in 1673. La Salle reached the Gulf of Mexico by way of the Mississippi in 1682.

MISSISSIPPI, a southern state of the United States, popularly known as the *Bayou State.* It is bounded on the north by Tennessee, east by Alabama, south by the Gulf of Mexico and Louisiana, and west by Louisiana and Arkansas. The State takes its name from the Mississippi River, which forms its western boundary for a distance of 500 miles, separating it from Louisiana and Arkansas. A portion of the western boundary is formed by the Pearl River and a small part of the northeastern border by the Tennessee River. The extent from north to south is 335 miles; average width, 150 miles; and area, 46,810 miles. This includes a water surface of 470 square miles. A number of islands in the Gulf of Mexico belong to the State, including Cat, Bois, Horn, Petite, and Ship, which are separated from the mainland by the Mississippi Sound.



MISSISSIPPI.

1, Jackson; 2, Vicksburg; 3, Meridian; 4, Natchez; 5, Columbus; 6, Biloxi. Chief railroads shown by dotted lines.

DESCRIPTION. Much of the surface is rolling land, broken in many places by valleys, but the highest ridges are in the northeastern part, where the altitude is about 1,000 feet above the sea. Extensive level tracts characterize the southern part and the region adjacent to the Mississippi. About one-sixth of the entire State lies in the river bottoms, of which the Yazoo bottoms are the most extensive. These lowlands are highly fertile and have been reclaimed by the construction of levees, which serve to prevent their overflow during high water. Cypress trees of much value are found in the swamp and marsh regions, while fine forests of timber are abundant on the drier lands.

Nearly all of the drainage is toward the south. The western part is drained by the Mississippi and its tributaries, which include the Yazoo, the Big Black, and the Homochitto rivers. A large section in the south central part is drained directly into the Gulf of Mexico by the Pearl River. The Tombigbee drains the northeastern part and the Pascagoula drains the southeastern part, both discharging directly into the Gulf. Though the Tennessee touches the northeastern corner, only a small part of the interior is drained by it. The State has a number of lakes, but all of them are directly connected with rivers. Biloxi Bay, Pascagoula Bay, and the Bay of Saint Louis are the largest inlets.

The climate is semitropical and highly favorable to vegetable growth. Though the summers are long, they are made pleasant and healthful by breezes from the Gulf. The southern part has a mean temperature of 50° in January, and near the northern boundary it is 40°. In summer the mean temperature is about 81°, though the heat frequently ranges from 85° to 100°. Frosts and light falls of snow visit the northern part, where the thermometer rarely reaches the zero point. All parts of the State have an abundant rainfall, the annual average being about 50 inches, but the southern part has over 60 inches. Rains occur most frequently in late winter or early spring, but precipitation is well distributed throughout the year. In summer the prevailing winds are south, while in winter they are north.

MINING. The mineral deposits consist principally of brown coal, limestone, and potter's and fire-brick clays. Gypsum deposits of considerable extent are found in the central part of the State, and these are worked quite extensively in some localities. The clays are worked more generally than any of the other minerals and the output is utilized in the manufacture of brick, pottery, and sewer pipe. Mineral springs are distributed in various parts, especially in the bluffs of the Yazoo and Mississippi rivers, and some of them have waters that contain valuable medicinal properties. Iuka Springs and Ocean Springs are widely known as health resorts.

AGRICULTURE. The nature of the soil and the favorable climate favor agriculture, which is the leading industry. The farms average 82 acres, and the majority of the farmers are Negroes. Only about 15 per cent. of the colored tillers own their farms, as against 63 per cent. for the

white farmers. Cotton is the chief crop and is grown on about one-half of the cultivated area. The State holds fifth rank in the yield of this product, being exceeded only by Texas and Georgia. Corn is grown extensively and the acreage is next to that of cotton. Other products include oats, hay, peas, wheat, rice, and fruits. The bottom lands are well suited to the cultivation of rice, but the acreage is not large. Many varieties of fruit are grown profitably, including figs, oranges, peaches, pears, and strawberries.

Stock raising represents large investments, but this enterprise does not receive as much attention as other departments of farming. Cattle are grown profitably, both for meat and dairying purposes. Other domestic animals include swine, horses, sheep, mules, and poultry.

Manufactures. The manufacturing enterprises are not extensive when compared to those of the eastern states, but considerable progress has been made for several decades. Lumber and timber products stand at the head of the list in the value of the output. Valuable areas of timber are still abundant, including such species as the oak, ash, cypress, beech, elm, sycamore, magnolia, holly, pine, hickory, and live oak. About two-thirds of the State are still included in the forest area. This has given rise to a long list of manufactures, such as turpentine, furniture, resin, and planing-mill products. A large quantity of fish and oysters are canned. Other manufactures include cotton-seed oil, flour, cotton and woolen goods, sugar, and tobacco products. Meridian, Vicksburg, and Natchez are the leading manufacturing cities.

Transportation and Commerce. Transportation facilities are afforded by the Tennessee, the Mississippi, and the Gulf of Mexico. Railway lines are operated to a considerable extent, aggregating 4,250 miles. Trunk lines and branches extend through the State at various points, affording communication with all the principal towns and cities. The principal railroads include the Southern, the Queen and Crescent, the Illinois Central, the Louisville and Nashville, and the Mobile and Ohio. Electric railways are operated in the cities and through some of the interurban points.

The State exports timber, cotton, corn, cotton-seed oil, turpentine, and timber products. Manufactured goods, such as clothing and machinery, are imported.

Education. The public school system dates from 1846, when it was established by a general law. Separate schools are maintained for white and for colored pupils. Although illiteracy has been reduced to 3.6 per cent., it is 29.3 per cent. among the Negroes. The school term averages 110 days per year in the State, a material increase since ten years ago, but the towns generally have school for nine months per year. Education is supervised by a State board, which consists of the superintendent of education, attorney-general, and secretary of State. This board and the senate have concurrent power to appoint a school superintendent for each county. The schools are supported mainly by local taxes, but the revenue derived from the State taxes is a material factor in building up the educational system. Educational work culminates in the State University, near Oxford. An agricultural and mechanical college is situated at Starkville. The private institutions of higher learning include Mississippi College, Clinton; Rust College, Holly Springs; Whitworth Female College, Brookhaven; Millsaps College, Jackson; Alcorn Agricultural and Mechanical College, Westside; and Cooper-Huddleston College, Daleville.

Adequate provisions have been made for the care of the unfortunates and for correctional purposes. Jackson has the State institution for the deaf and dumb, Meridian and Jackson have hospitals for the insane, Vicksburg and Natchez have hospitals that are supported by the State, and Jackson has a school for the blind. The prisons are at Parchman, Oakley, and Rankin. Most of the prisoners are put to work upon farms, either owned by the State or rented, and those committed to the county jails are likewise similarly employed. Vicksburg has a Confederate hospital and a home for indigent Confederate soldiers is maintained at Beauvoir.

Government. The constitution under which the State is governed was adopted in 1890. It vests the chief executive authority in the governor, lieutenant governor, treasurer, auditor, attorney-general, and secretary of State, all of whom are elected for four years. The governor, treasurer, and auditor cannot be elected to immediately succeed themselves or each other. The Legislature consists of a senate and a house of representatives, the members of both branches being elected for four years. It convenes in regular session on the Tuesday after the first Monday of January of every fourth year after 1892, but special sessions may be convoked by the Governor. Six judges chosen at elections by popular vote for terms of eight years constitute the supreme court. Judges of the circuit and chancery courts are elected in the same way for four years. Each county is divided for the purpose of local government into districts instead of townships.

Inhabitants. Only a small per cent. of the people are of foreign birth. The State has the largest per cent. of colored population, though Georgia has a greater number of colored inhabitants. In some counties near the Mississippi the Negroes are five times as numerous as the whites. Jackson, on the Pearl River, is the capital of the State. Other cities include Vicksburg, Meridian, Natchez, Greenville, Columbus, Aberdeen, Yazoo City, Biloxi, and Wesson. In 1900 the State had a population of 1,551,270. This included a colored population of 908,370,

including 237 Chinese, 2,203 Indians, and 905,930 Negroes. Population, 1920, 1,789,384.

HISTORY. The region now included in the State of Mississippi was first visited by a Spanish expedition under De Soto in 1540, but no traces of a settlement were left. In 1673 Joliet and Marquette came down the Mississippi, and in 1682 La Salle took formal possession of the region in the name of the King of France. The French settled at Biloxi Bay in 1699, under Iberville, who brought 200 immigrants from France. Soon after, in 1718, settlements were made in the vicinity of New Orleans. The territory was ceded by France to England in 1763. It was included within the State of Georgia until 1798, when it was organized as a territory of the Union, and in 1817 was formally admitted as a State. When the Civil War commenced, the State seceded from the Union, and, owing to its location on the Mississippi River, it became the scene of a number of important battles, including those of Corinth, Holly Springs, Iuka, and Vicksburg. The war caused the State to lose greatly in population and wealth. However, within the last quarter of a century it has been developing rapidly its material resources, building cities, extending manufactures, and giving aid to the progress of educational and industrial arts.

MISSISSIPPI, University of, a State coeducational institution near Oxford, Miss., opened for instruction in 1848. It was suspended during the Civil War and was maintained chiefly by annual grants of the Legislature until 1880. The departments include those of science, law, pedagogy, philosophy, mining, civil and electrical engineering, and liberal arts. With it are affiliated the accredited high schools, from which students are admitted without examination. It has an endowment fund of $795,000, a library of 42,500 volumes, and property valued at $1,250,000. The professors and instructors number 60, while the attendance of students is 965.

MISSISSIPPI SCHEME, an enterprise promulgated at Paris, France, in 1717, by John Law. The scheme was to develop by colonization the Mississippi valley, for which purpose a large amount of currency and bonds were issued, which sold at a premium for a long time. The enterprise attracted the attention of investors from all the civilized countries, but later the stock began to decline and the scheme proved an entire failure. John Law fled from France when the company became bankrupt, in 1720, and soon after the government assumed the obligation to pay the paper currency and the stock issued to shareholders.

MISSOLONGHI (mĭs-sō-lŏn′gē), a town of Greece, on the Gulf of Patras, an extension from the Mediterranean Sea. It is memorable as a center for the Grecian revolutionists from 1821 until 1822, when it was held by Marco Bozzaris against Turkish besiegers. In 1824 Lord Byron came to Missolonghi to assist the Greek patriots, but died there the same year. The town is located on a level region, has a considerable trade, and contains fine statues of Byron and Bozzaris. Population, 1922, 9,206.

MISSOULA (mĭ-zōō′lä), a city of Montana, county seat of Missoula County, on the Hell Gate River, 125 miles northwest of Helena. It is on the Milwaukee and the Northern Pacific railroads and is in a mining, farming, and lumbering region. The buildings include a public library, several public and private schools, and a number of churches. It is the seat of the Missoula Business and Normal College, the Sacred Heart Academy, and the University of Montana. The industrial enterprises include flour mills, bottling works, and railway shops. The first settlement on its site was made in 1864 and it was incorporated in 1887. Within recent years it has grown rapidly in population and commercial enterprises. Population, 1920, 12,668.

MISSOURI (mĭs-sōō′rĭ), meaning muddy river, the largest confluent of the Mississippi. The source is near the boundary line between Idaho and Montana, where it springs from the Rocky Mountains, and thence has a general course toward the northeast to the northern part of Montana. In the latter State the Missouri flows east, entering North Dakota, and thence has a southeasterly course until it reaches the Mississippi River, about eighteen miles above Saint Louis. It is 2,920 miles from its source to its junction with the Mississippi, about three-fourths of the distance being navigable. At a point about 400 miles from its source is a gorge 450 feet wide and 1,200 feet deep, known as the Gates to the Rocky Mountains, and 550 miles from its source are the Great Falls, consisting of four consecutive cataracts. The principal tributaries of the Missouri are the Yellowstone, the James, the Cheyenne, the Niobrara, the Big Sioux, the Platte, the Kansas, the Grand, and the Osage. Among the cities on its banks are Great Falls, Bismarck, Pierre, Sioux City, Council Bluffs, Omaha, Atchison, Leavenworth, Kansas City, and Jefferson City.

MISSOURI, a central state of the United States, situated about midway between the Rocky Mountains and the Atlantic Ocean, popularly called the *Bullion State*. It is bounded on the north by Iowa; east by Illinois, Kentucky, and Tennessee; south by Arkansas; and west by Oklahoma, Kansas, and Nebraska. A part of the western boundary is formed by the Missouri, which enters the State at Kansas City, and the eastern border is mainly by the Mississippi. A small portion of the eastern boundary is formed by the Des Moines. Southward it projects between the Mississippi and the Saint Francis rivers. From north to south the State has a length of 285 miles. The width at the northern boundary is 208 miles and at the southern it is 312 miles. The area is 69,450 square miles, including 680 square miles of water surface.

DESCRIPTION. The Missouri River, which forms the western boundary from the northern line to Kansas City, flows across the State. About one-third of the State lies north of the Missouri River. This portion is made up largely of a rolling prairie, while the southern part is hilly or mountainous, including the principal chains of the Ozark Mountains. The general elevation is from 350 to 800 feet above the sea level, but the highest ranges of the Ozark Mountains rise to altitudes of 1,600 feet. Tom Sauk, Pilot Knob and Iron Mountain, in the eastern part, are the highest summits. Along the Mississippi are level bottoms and these are protected from inundation by levees.

All of the drainage belongs to the Mississippi, which forms the eastern boundary. The principal tributary is the Missouri, which flows into it about eighteen miles north of Saint Louis. Other rivers flowing into the Mississippi include the Salt, which drains the northeastern part, and the Saint Francis, which drains the plain in the southeastern section. The White

MISSOURI.

1, Jefferson City; 2, Saint Louis; 3, Kansas City; 4, Saint Joseph; 5, Springfield; 6, Joplin; 7, Hannibal; 8, Chillicothe. Chief railroads shown by dotted lines.

and the Black rivers, in the south, cross the southern border and flow into the Arkansas. Much of the drainage in the central and northern parts is by the Missouri, which receives the Platte, the Grand, and the Chariton rivers from the north, and the Osage, the Gasconade, and the Lamine from the south. Most of the streams within the State are tortuous and flow slowly, hence are subject to overflows during excessive rains; the Ozark rivers have swift currents.

The climate is continental and healthful, but it is subject to the extremes common to the interior of the continents. The winters are short, the summers are long, and the winds are rarely excessive. In the Ozark Plateau the heat of summer is tempered by elevation, though the extremes in summer sometimes register from 95° to 102° on the thermometer. In July the mean temperature varies from 75° to 80° and in January from 20° to 35°, though the minimum of 10° below zero is sometimes reached. All parts of the State have ample rainfall, which ranges from 30 inches per year in the north to 60 inches in the south. It is quite uniformly distributed throughout the year, the greatest amount of precipitation occurring in the spring. The fall of snow ranges from 10 to 20 inches.

MINING. The State has large mining interests. In the output of zinc it occupies a high place, producing more than one-half of the total spelter in the country. It ranks first among the states in lead mining and holds second rank in the quarrying of building stone. The coal fields, which extend into it from Iowa and Kansas, yield a fine grade of bituminous coal, and the product is used largely for the local consumption. Extensive beds of iron ore are found in the Ozark Plateau, especially in the vicinity of Pilot Knob and Iron Mountain, which are famous for their large yield of hematitic ore. Granite and limestone are quarried in many sections of the State and valuable clays for brick and pottery are abundant. Other minerals include copper, petroleum, natural gas, manganese, and mineral waters.

AGRICULTURE. The State holds a high rank in agriculture, which is the most extensive industry. About 78 per cent. of the total area is included in farms, which average 120 acres. Corn is grown on a larger area than that of all other crops, hence the State is one of the leading producers of that cereal. Hay and forage crops are the next most important productions and both the acreage and the yield are large. Both spring and winter wheat can be grown successfully, but the greater share of attention is given to the latter, and the crop is especially favorable for milling. Other farm products include oats, flax, potatoes, sorghum, rice, rye, and cotton, but the last mentioned is grown exclusively in the southern part. Large interests are vested in raising tobacco, tomatoes, grapes, melons, and strawberries. Apples of a fine quality are produced throughout the State and many of the orchards contain a large number of peach, pear, and cherry trees, all of which produce abundantly.

Missouri is one of the cattle-growing states, both for meat and dairying, but the former receives the larger share of attention. The large yield of corn makes it important for swine raising. Other domestic animals include horses, sheep, mules, and poultry.

MANUFACTURES. The State has the largest manufacturing interests west of the Mississippi. This condition is due to the presence of extensive resources, such as are yielded by the mines, farms, and forests. Saint Joseph and Saint Louis have large interests in slaughtering and meat packing. The smelting of zinc is carried on chiefly at Carthage and Joplin. Many of the streams yield an abundance of water power.

hence flouring and grist mills are located in many sections of the State, but the larger share of flour milling is done in the larger cities by steam power. Saint Louis and Kansas City are noted as publishing centers and for the manufacture of boots and shoes. These cities likewise have extensive publishing interests. Missouri ranks first in the manufacture of chewing and smoking tobacco, first in zinc and lead, second in boots and shoes, fourth in slaughtering and meat packing, and seventh in flour milling. Other manufactures include motor trucks, wagons, clothing, machinery, confectionery, and railway cars.

Transportation and Commerce. Extensive communication by water is afforded by the Missouri and Mississippi rivers, but that of the former is of greater importance. Formerly the Missouri River carried a large water traffic, though this has been largely displaced by the building of railways across the State. Numerous lines cross the State, including a number that furnish direct connections with many trade centers of the country. The largest number of lines are in the northern half of the State and the principal railway centers are Saint Louis, Kansas City, and Saint Joseph. Among the chief railroads are the Wabash, the Chicago and Alton, the Missouri Pacific, the Chicago, Burlington and Quincy, the Atchison, Topeka and Santa Fé, the Southern, the Chicago, Milwaukee and Saint Paul, and the Saint Louis and San Francisco. Electric lines are operated in all the larger cities, and these lines connect with many urban and interurban points. The railways aggregate 8,050 miles.

Missouri has large commercial interests, both within the State and with other sections of the country. Saint Louis and Kansas City are noted as grain and stock markets, and distribute large quantities of merchandise throughout the southwestern part of the United States. Among the leading exports are meats, fruits, lead, zinc, iron ore, glass, tobacco, clay products, and boots and shoes. Coffee, tea, sugar, and clothing are among the leading imports.

Government. The constitution now in force was adopted in 1875. A governor, lieutenant governor, treasurer, auditor, secretary of State, attorney-general, and superintendent of public instruction are elected by a popular vote of four years, but the governor and treasurer cannot be reëlected to succeed themselves. The Legislature consists of 34 senators elected for four years and 142 representatives elected for two years. Sessions of the Legislature convene on the Wednesday after the first day of January of odd years. Seven judges elected for ten years constitute the supreme court. The judges of the circuit courts are elected for six years. Kansas City, Saint Louis, and Springfield have appellate courts, and each county has a probate and a county court. Government is administered locally by county officers. Each county is subdivided into townships, which are presided over by officers elected by the people.

Education. Higher education in Missouri is ably cared for by the State university, the six teachers' colleges, the Missouri College Union, and a number of public high schools of very high class, notably those of the cities and the larger rural communities. The State has about eighty other colleges and academies and more than 600 public high schools. The State University is located at Columbia, where it was established in 1839. It began with a faculty of five, an enrollment of 78, and two graduates at the end of the first year. During the Civil War the faculty and the enrollment were reduced materially, but since that time there have been no interruptions in the satisfactory growth of the institution. The faculty, including that of the Rolla School of Mines, which is about thirty in number, is 380, and the enrollment averages 6,000 students.

Nine colleges, in addition to the State University, belong to the Missouri College Union, as follows: Central, Fayette; Westminster, Fulton; William Jewell, Liberty; Missouri Valley, Marshall; Park, Parkville; Saint Louis University, Saint Louis; Washington University, Saint Louis; Drury, Springfield; and Tarkio, Tarkio. These schools spend annually for salaries of the presidents, teachers, and tutors, $550,000; for incidentals, rents, and libraries, $240,000; total, $790,000. They are well equipped with libraries and facilities to teach biology, physics, and chemistry. The value of buildings and grounds is $10,500,000; the permanent endowment, $30,500,000.

The State maintains six teachers colleges, including Lincoln University, at Jefferson City, an institution for Negro teachers. The schools at Kirksville, Warrensburg, and Cape Girardeau were founded in 1871; Lincoln University became a State institution in 1879; and the other two, one at Springfield and one at Maryville, were established by legislation in 1905 and began operations in 1906. These six institutions have a combined enrollment of 7,500 and represent an outlay of $4,162,000. Additional normal instruction is given at the Teachers' College, a department of the State University. The high schools of the State do thorough and advanced work and are well equipped with libraries and apparatus for teaching the sciences. General supervision of the schools is vested in the State superintendent of public instruction, who is assisted by a county superintendent in each county, the county superintendency having been established in 1909.

Many charities and benevolent institutions are maintained by the State. Hospitals for the insane are located at Farmington, Fulton, Saint Joseph, and Nevada. An institute for the feebleminded is at Marshall. Fulton has the State school for the deaf and dumb; Saint Louis, the school for the blind; Chillicothe, the industrial home for girls; Boonville, the training school

for boys; Jefferson City, the State penitentiary; Sedalia, the State fair.

Inhabitants. Missouri is ninth among the states in population. It has a larger foreign-born population than any of the states classed as southern, and fully half of these are Germans. The density is greater than that of any other State west of the Mississippi, being 46 to the square mile. Jefferson City, on the Missouri River, is the capital. Other important cities include Saint Louis, Kansas City, Saint Joseph, Joplin, Springfield, Sedalia, Hannibal, Moberly, Carthage, Independence, Saint Charles, Chillicothe, and Nevada. In 1900 the population was 3,106,665. This included a total colored population of 161,822, of which 130 were Indians, 449 Chinese, and 161,234 Negroes. Population, 1910, 3,293,335; in 1920, 3,403,547.

History. A Spanish expedition under De Soto visited the region included in Missouri in 1541, and Marquette explored some portions of it in 1673. A settlement was made by the French at Saint Genevieve about 1735 and not long after other permanent settlements were made along the Mississippi and in the vicinity of Saint Louis. In 1803 the territory was ceded to the United States as a part of the Louisiana Purchase. Two years later the southern part was organized as the Orleans Territory and the northern part as that of Louisiana. In 1812 the Missouri Territory was formed, and Congress was asked to allow the framing of a State constitution in 1817. An extended controversy regarding slavery in Missouri arose immediately, which was settled by the Missouri Compromise of 1820, and the following year it was admitted to the Union, on Aug. 10, 1821. The Civil War occasioned much loss of property and life in the State, it being a prolific field for contests between northern and southern interests, but after the war its resources began to be developed with much rapidity and it now ranks as the fifth State in wealth.

MISSOURI, University of, a coeducational State institution at Columbia and Rolla, Mo., established in 1843. The university proper is located at Columbia and the Rolla School of Mines, a part of the institution, is at Rolla. It comprises departments of law, education, medicine, military science and tactics, mines and metallurgy, and agricultural and mechanical arts, and has graduate academic departments. The faculty consists of 380 professors and instructors, and the average attendance is 6,000 students. It has a library of 300,500 volumes and an endowment of $2,750,000.

MISSOURI COMPROMISE, an act of Congress passed as a compromise measure to effect a settlement regarding the extension of slavery in the regions beyond the Mississippi River. The act was passed in 1820 and provided that Missouri should be admitted into the Union as a slave-holding State. However, it made the restriction that slavery should never be established in any State to be formed from regions lying north of latitude 36° 30′.

MISSOURIS, a tribe of North American Indians, belonging to the Siouan stock, first met with along the Grand River, a tributary of the Missouri. It is thought that they were once identified with the Iowa and Oto Indians. In 1805 they settled largely along the Platte River in Nebraska, where they joined the Otoes. At present the tribe includes a large per cent. of Indians who have made considerable progress in educational and industrial arts.

MISTLETOE (mĭz″l-tō), a parasitic plant growing on many varieties of plants, especially on the oak, poplar, lime, ash, apple, and other fruit trees. About thirty species have been described, but the common mistletoe is the best known. It grows to a length of from one to five feet, has a greenish-yellow appearance, and its fibrous roots penetrate into the wood of the tree upon which it preys. Its leaves are oblong, the flowers are yellowish-green, and it bears yellow viscid berries. The mistletoe is found widely distributed in North America and Europe. When young, the mistletoe is succulent, but it becomes woody when old. The view held that it is an antidote to apoplexy has long since been abandoned, and its principal use at present is for making birdlime from the berries. The ancient Celtic peoples of Europe and the Druids regarded the mistletoe with much veneration. It was thought to be effective in the cure of diseases and a preventive of sickness. Ability to see ghosts was thought to result to those having a plant in possession. Many old superstitions regarding the mistletoe are still extant in Germany and other European countries, such as kissing under the mistletoe at Christmas as a proof that it is an emblem of love.

MITCHEL (mĭch′ĕl), **Ormsby MacKnight,** soldier and astronomer, born in Morganfield, Ky., July 28, 1809; died in Beaufort, S. C., Oct. 30, 1862. He graduated with Robert E. Lee and Joseph E. Johnston from the West Point Military Academy in 1829 and served in the artillery until 1832, when he became professor of mathematics in the United States Military Academy. In 1836 he accepted a professorship in Cincinnati College, and in 1844 was made first director of the observatory in connection with that college. In 1859 he became director of the Dublin University at Albany, N. Y., and at the beginning of the Civil War enlisted for service in the Union Army. He was promoted to the rank of major general in 1862 and was assigned to the department of the South, but died from the effects of yellow fever. Mitchel made many astronomical discoveries, among them that Antares is a double star. He announced various valuable observations regarding nebulae. His publications include "Concise Treatise of Planets, Satellites and Comets," "Planetary and Stellar Worlds," and "Astronomy of the Bible."

MITCHELL, a city of South Dakota, county seat of Davison County, 68 miles west of Sioux Falls. It is on the Chicago and Northwestern and the Chicago, Milwaukee and Saint Paul railroads, and is surrounded by a fertile farming country. The buildings include the high school, the county courthouse, and the Dakota Wesleyan University. Among its manufactures are flour, brooms, brick, and machinery. It has systems of waterworks and sewerage. The place was settled in 1879 and incorporated in 1883. Population, 1905, 5,719; in 1925, 10,119.

MITCHELL, Donald Grant, author, known as *Ik Marvel,* born in Norwich, Conn., April 12, 1822; died Dec. 15, 1908. He graduated at Yale in 1841, spent several years in European travels, and later studied law in New York City. Shortly after he began to write profusely, many of his works having a very wide reading. He became consul at Venice in 1853, retired to a farm near New Haven two years later, and there contributed largely to various periodicals. In 1876 he served as a judge of industrial art at the Centennial Exposition, and was a United States commissioner at the Paris Exposition of 1878. Though his themes are not profound, yet he was able to blend pensive fantasy with accurate perceptions of life, expressing all in a clear and chaste style. Among his writings are "Dreamlife," "My Farm at Edgewood," "Out-of-town Places," "About Old Story Tellers," "English Lands, Letters, and Kings," "Fresh Gleanings," and "Reveries of a Bachelor."

MITCHELL, John, labor leader, born in Braidwood, Ill., Feb. 4, 1869. He attended the public schools and obtained a practical education largely by personal work, together with the benefits acquired by extensive travel and reading. In 1882 he worked in the coal mines at Braidwood and a few years later traveled in the western states, including Colorado and New Mexico. He returned to Spring Valley, Ill., in 1886, to work in the mines, and while there became an active and influential member of the Knights of Labor. He was among the first to join the United Mine Workers of America, organized in 1890, served on the legislation committee of Illinois Mine Workers, and in 1899 was made president of the United Mine Workers of America. In his official capacity he did much to extend favorable opinion in support of the eight-hour work day and bring about an adoption of arbitration. In 1902 he rendered effective service in effecting a settlement by arbitration of the strikes in the anthracite region of West Virginia and Pennsylvania. Governor Glynn, in 1914, made him a member of the Industrial Commission of New York.

MITCHELL, John Hipple, public man, born in Washington County, Pennsylvania, June 22, 1835; died Dec. 8, 1905. He attended public schools and began teaching at the age of seventeen. Subsequently he took a course at Witherspoon Institute, was admitted to the bar, and practiced law in San Luis Obispo and San Francisco. In 1860 he removed to Portland, was State senator for Oregon from 1862 until 1866, and was elected United States Senator in 1873, 1885, and 1901. He was convicted of land fraud in 1905 and the case was appealed, but his death occurred before a final decision was reached. His daughter married the Duke of Rochefoucauld of France.

MITCHELL, Maria, mathematician and astronomer, born in Nantucket, Mass., Aug. 1, 1818; died June 28, 1889. Her father was a teacher of astronomy and at an early age she acquired an interest in that branch of study. She assisted him in many of his classes and soon after began observations of the heavenly bodies. In 1847 she discovered a small comet, calculated its elements, and was awarded a gold medal by the King of Denmark and a medal from the San Marino Republic. Soon after she was employed by the United States coast survey, aided in compiling the American *Nautical Almanac,* and in 1857 visited Europe, where she was received with honors by John Herschel, Humboldt, and Leverrier. She became professor of astronomy at Vassar College, Poughkeepsie, N. Y., in 1865, which position she held until 1888. Many American and foreign associations extended her distinguished honors, and she was awarded degrees by Hanover and Columbia colleges.

MITCHELL, Silas Weir, author and neurologist, born in Philadelphia, Pa., Feb. 15, 1829. His father was a physician and chemist and exercised care in securing for his son a careful education. Silas graduated at the University of Pennsylvania and in 1850 secured a degree at the Jefferson Medical College. During the Civil War he practiced in the military hospitals of Philadelphia, where he had charge of those affected by nervous diseases, and later entered upon the medical practice in the same city, giving particular attention to neurology. His study was devoted largely to all classes of nervous troubles and poisons as affecting the system, particularly that of snakes. Several American and foreign scientific societies elected him to positions of honor, and he was for some time president of the College of Physicians. His writings include "Hints to the Overworked," "In War Times," "In the Forest," "Doctor and Patient," "How to Make Fat and Blood," and "Adventures of Francois." He died Jan. 4, 1914.

MITE, a very small articulated animal, belonging to the same class as the spiders. Many species of animals are classified as mites, ranging from certain microscopic forms to those fully half an inch long. Most of the species have four pairs of feet, while others have six to eight pairs, and the mouth is fitted for boring and sucking. They differ from the spiders by being smaller in size and by the body being unsegmented, though to the latter there are some restrictions. The body of some mites is covered

with scales, while others have hairs or bristles. They are parasitic, feeding on the juices of plants and the blood of animals. A few are aquatic, living in water, while others live on plants or animals. *Gall mites* produce enlargements on the leaves and stems of plants, and itch mites burrow into the skin of man and produce itch. *Ticks* fasten themselves to various animals, especially to dogs and sheep, feeding upon the blood. The *spinning mite,* or *red spider,* is so called from the tiny thread which it weaves while moving about. Nearly all of the species are injurious, either as parasites or for spreading diseases, though some are beneficial in that they destroy the eggs of injurious insects. The *cattle tick* is particularly injurious in spreading disease among cattle in warm countries and the *chicken tick* infests poultry in warm climates.

MITFORD (mĭt'fĕrd), **Mary Russell,** authoress, born in Hampshire, England, Dec. 16, 1787; died Jan. 10, 1855. Her father presented her with a lottery ticket on her tenth birthday, which drew $100,000, and this money was spent readily, but not until she had secured a liberal education. Subsequently she began to contribute to the *London Magazine,* wrote various plays for the stage, and produced numerous poems and several essays. The best of these writings were selected and published in "Our Village," a work of five volumes. Her reputation is based principally upon these volumes. They contain a series of sketches of village scenes true to life, which have been republished at various times. Other publications from her pen include "Atherton and Other Tales" and "Recollections of a Literary Life."

MITHRIDATES (mĭth-rĭ-dā'tēz), or **Mithradates,** surnamed The Great, King of Pontus and other countries of Asia Minor. He was born about 133 B. C., succeeding his father as king at the age of thirteen years. After reaching his majority, he began to plan for a conquest of Asia Minor. In the war against Bithynia, he was supported by the Romans and soon after conquered the Roman possessions of Asia Minor. Immediately he sent large armies into Greece, but Sulla with a Roman army required him to conclude peace, and he was forced to retreat in 84 B. C. The death of Sulla opened a way for Mithridates to enter upon a second attempt to secure possession of the Roman provinces, but in 74 B. C. he was defeated by Lucullus, and was compelled to retreat from his own possessions into Armenia. Soon after he organized a vast army for a third war against the Romans and was everywhere successful, recovering most of his former possessions. Accordingly, Pompey was sent from Rome with a large force, and, being clothed with absolute power in the eastern provinces, rapidly gathered an army that completely crushed the army of Mithridates near the Euphrates River. Mithridates next proceeded to the Crimea with his army, where a mutiny broke out among his forces, and in a fit of despair he committed suicide in 63 B. C. History gives him a place among the most eminent rulers of Asia Minor. He is spoken of as a man of education and industry and a patron of learning. Besides being a student of Greek literature, he understood twenty different languages.

MIVART (mī'värt), **Saint George,** naturalist and author, born in London, England, Nov. 30, 1827; died April 1, 1900. He studied at the Harrow School, King's College, and at Saint Mary's College. In 1851 he was admitted to the bar, but later studied medicine at Saint Mary's Hospital and at Louvain, France. He was successively professor of biology in University College and of natural history at Louvain, securing the latter place in 1890. Several learned societies conferred distinguished honors upon him. His writings oppose the theories of Darwin so far as they relate to the evolution of man, but support many of those bearing upon the operation of development and selection in the lower types. They include "The Genesis of Species," "The Origin of Human Reason," "Man and Apes," "Nature and Thought," "Types of Animal Life," and "Introduction to the Elements of Science."

MJÖSEN. See **Miösen.**

MOABITES (mō'ăb-īts), a race of people that inhabited the regions of the Dead Sea and the Jordan River, where they pursued a pastoral life. The Israelites came in contact with them after immigrating into Canaan, and in the time of the judges they exercised superior power over the Jews. David made them tributary about 1025 B. C., but later they formed an alliance with the Chaldaeans against the Jews. Their descendants have long since been lost among the Arabs, but there are various monuments of black basaltic granite that have been ascribed to these people. See **Moabite Stone.**

MOABITE STONE, a block or stone discovered by F. Klein, a German missionary, at Diban, in ancient Moab, in 1868. On it are 34 lines written in the Moabite language, the inscription being a record of the achievements of Mesha, a King of Moab, who reigned about 880 B. C. The stone is black basaltic granite, about three feet eight inches high, two feet three inches wide, and one foot thick. It is rounded at both ends. After it was discovered, a dispute arose among the Arabs about the sale of it, and it was broken to pieces. However, the fragments were collected and are now in the Louvre, Paris.

MOBERLY (mō'bĕr-lĭ), a city of Missouri, in Randolph County, 63 miles southwest of Hannibal, on the Wabash and the Missouri, Kansas and Texas railroads. The surrounding country is rich in stock and cereals and produces an abundance of coal and hardwood lumber. It has a public library, the Saint Mary's Academy, a fine high school, and a Y. M. C. A. building. Among the manufactures are earthenware, flour, lumber, ice, farming implements,

and machinery. The city has large machine shops and is the center of an extensive grain and jobbing trade. Population, 1920, 12,808.

MOBILE (mō-bēl'), a river of the United States, formed in southern Alabama by a union of the Tombigbee and Alabama rivers. It was so named from the Indians inhabiting that region at an early period of history. There are properly two branches after the union of the two rivers, the east branch being the Tansas River and the west branch the Mobile. These branches unite and divide several times, and after a course of fifty miles flow into Mobile Bay, an inlet from the Gulf of Mexico.

MOBILE, a city in Alabama, county seat of Mobile County, on a bay and river of the same name, forming the only seaport of the State. It is on the Southern, the Mobile and Ohio, the Louisville and Nashville, and other railroads. The site is on a plain rising gradually from the river. The streets are regularly platted and many of them are improved by avenues of magnolia and live-oak trees. Among the noteworthy buildings are the county courthouse, the public library, the City Hall and Armory, the public high school, the United States Marine Hospital, the Masonic Temple, the city hospital, and the Cathedral of the Immaculate Conception. It is the seat of the Alabama State Docks, the Spring Hill College, the Barton Academy, the Scottish Rite Temple, the Academy of the Visitation, and the system of port terminals.

Mobile has a large trade in tobacco products, lumber, fruits, fish, and oysters. Improvements in the mouth of Mobile Bay have increased its importance as a port of entry and regular lines of steamers ply between it and New York, Liverpool, New Orleans, and other American and European trade centers. It has manufactures of cotton goods, lumber products, furniture, machinery, ironware, tobacco products, earthenware, and utensils. The city has electric street railways, asphalt and cement pavements, and systems of waterworks and sanitary sewerage. A French settlement under Iberville was established near Mobile in 1702. Before coming into possession of the United States it was successively under French, English, and Spanish dominion, and until 1723 was the capital of the French colony of Louisiana. In 1803 it was acquired by the Louisiana Purchase. Admiral Farragut defeated the Confederates in Mobile Bay in 1864. Population, 1920, 60,777.

MOBILE BAY, an inlet from the Gulf of Mexico into Alabama, having a length of thirty miles and a width of from eight to sixteen miles. The mouth of the bay at the Gulf of Mexico is about three miles wide. Its entrance is guarded by forts Gaines and Morgan. The depth is from twelve to fourteen feet. Sediments flowing through the Mobile River are tending constantly to make it more shallow, but there have been some improvements to at least partially overcome this tendency. From August 5 to 23, 1864, it was the scene of a naval engagement between the Federal fleet under Admiral Farragut and the Confederate forces under Admiral Buchanan, which resulted in the surrender of forts Gaines and Morgan and a Union victory.

MOCCASIN (mŏk'kà-sĭn), the name of a poisonous serpent of North America, which is found largely in swamps of the warmer regions. It is fish eating. The general color is brown with black bars. It attains a length of about two feet. Species of these snakes are found in North Carolina and the country toward the south and in some localities west of the Rocky Mountains.

MOCCASIN, a kind of shoe worn by the North American Indians. It is usually made of deerskin or some other variety of soft leather, the sole and upper part of which are formed of one piece. The finer grades are ornamented with beads of various colors and fine leather trimming.

MOCKING BIRD (mŏk'ing bĕrd), the popular name of about twenty species of birds of the thrush family, most of which are widely distributed in North America, the West Indies, and Northern South America. The color is ashy-brown above and whitish beneath, and the wings and tail are varied with black and white. Most species are found in the warmer regions, but during the summer time they visit the northern parts to breed. Their nests are built near houses and are formed of grasses and twigs. The parents show considerable bravery in defending the young against cats, snakes, and other intruders. They were named from their ability to imitate the songs of other birds and such sounds as the quacking of ducks, barking of dogs, and bleating of lambs. At night they do not attempt to imitate, but sing their own natural notes, which are bold, rich, and full, and varied almost without limitation. Several species are able to imitate with exactness the soft notes of the bluebird and the wild screams of the eagle. In color they differ somewhat. The common mocking bird is about ten inches long and has an ashy-brown color. The bill and tail are black.

MODENA (mō'dă-nà), a city of northern Italy, on a fertile plain between the Panaro and Secchia rivers, 22 miles northwest of Bologna. It is fortified by substantial walls and has well-improved streets, but within recent years it has not been improving materially. Several railways connect it with other centers of trade. It has manufactures of silk and woolen goods, machinery, ironware, leather, and utensils. Several public buildings date back many centuries, among them the University of Modena, founded in 1678. This institution has advanced courses of study, an observatory, a military school, a botanical garden, and an extensive library. A fine Gothic cathedral is situated here and a royal palace contains the Este library of 100,000 vol-

umes. The city was built by the Etruscans, but later fell successively into the hands of the Gauls, Romans, Goths, and Longobards. In the time of Constantine the Great it was destroyed, and in 960 it came into the possession of a member of the house of Este, who was proclaimed Marquis of Modena. It was made a part of the Cisalpine Republic in 1796 and in 1860 was united with the kingdom of Italy. Population, 1922, 76,308.

MODICA (mō'dē-kä), a city of Sicily, in the province of Syracuse, thirty miles southwest from Syracuse. It is located in a rocky region, but the surrounding country is among the most productive districts of Sicily, and in its vicinity are valuable rock formations. The chief buildings include the public library, the theater, a gymnasium, and a cathedral. It has a considerable export trade in wool, soda, butter, cheese, tobacco, wine, and hemp. Population, 1922, 49,386.

MODJESKA (mŏd-jĕs'kä), **Helena,** noted actress, born in Cracow, Austria, Oct. 12, 1844; died in Orange County, California, April 8, 1909. She showed much aptitude for the stage at an early age, but, owing to opposition by the family, her talents were not professionally developed. In 1861 she married an official named Modrzejewska, whose name she retained with a slight modification in spelling, and shortly after joined a company of strolling players. She was left a widow in 1865 and three years later married a Polish patriot and journalist named Charles Chlapowski, and under his influence became the star performer of Warsaw. In 1876 she accompanied her husband to California, where he thought of founding a Polish colony, but soon after she again appeared on the stage in California, and at once entered upon a successful tour of the United States. At the Columbian Exposition she delivered an eloquent address in behalf of Polish independence, on account of which she was officially forbidden to enter Russian territory. Her successes were alike marvelous in the leading cities of America and Europe. Among the rôles in which she appeared to the best advantage are as *Rosalind* in "As You Like It," *Mary Stuart* in Schiller's play of that name, *Beatrice* in "Much Ado About Nothing," and *Marguerite Gautier* in "La Dame aux Camellias."

MODOCS (mō'dŏks), a tribe of Indians of North America, found originally in the vicinity of Klamath Lake, California. They became hostile to the whites as early as 1847. In 1864 their lands were ceded to the United States under an agreement to go on a reservation, but the region set apart for them was not selected until 1871. Treachery on the part of government agents caused them to engage in a warfare against the United States troops, their leader, Captain Jack, demonstrating much ability in strategy and defense. In 1872 they fortified themselves in the mountains, where they offered stubborn resistance, and in 1873 murdered General Canby and others serving on a peace commission sent to treat with them. Shortly after they were finally quelled, when Captain Jack and other leaders of the rebellion were hanged, and the remainder of the tribe was located on the Quapaw reservation in Indian Territory, now Oklahoma.

MOFFAT, Robert, missionary, born in East Lothian, Scotland, Dec. 21, 1795; died Aug. 9, 1883. He was sent to South Africa by the London Missionary Society in 1816, landing at Cape Town in the early part of 1817. His field of operation was in Namaqualand, where he was permitted by Africaner, a native chief, to establish missions. While there he translated the Bible and a number of standard books into the native tongue, and for a period of several years greatly advanced civilizing influences. In 1842 he published at London his "Missionary Labors in South Africa." A period of more than fifty years was devoted to missionary work, and in 1873 he was presented with a fund of $29,000 by his supporters and friends at London. The explorer, Dr. David Livingstone, married his daughter Mary.

MOFFAT TUNNEL. See Tunnel.

MOGUL (mō gŭl'), the popular name applied to the sovereigns of the empire founded by the Mongols under Baber, in 1525, which remained a powerful political influence until 1803. The Moguls were descendants of Tamerlane, or Timour, the most noted of the Tartars. Mohammed Bahadoor was the last representative of the Mogul dynasty, being deprived of his title for taking part in the Sepoy mutiny in 1858.

MOHÁCS (mō'häch), a town of Hungary, on the west branch of the Danube, 25 miles southeast of Fünfkirchen. It is not well built, but has a large trade in lumber, coal, grain, and live stock. The place has a good harbor and railroad communication. Mohács is noted for a battle fought here on Aug. 29, 1526, between the Hungarians and Turks. Louis II. commanded 25,000 Hungarians, but was defeated by 200,000 Turks under Soliman the Magnificent, the Hungarian loss being 22,000 men. On Aug. 12, 1687, a second battle was fought against the Turks by the allied Austro-Hungarian army under Charles of Lorraine, in which the former were defeated. This battle terminated the dominion of the Turks in Hungary. Population, 1922, 15,904.

MOHAIR (mō'hâr), or **Camlet,** a fabric made of the hair taken from the Angora goat and allied species of animals. Formerly camlet was made entirely of camel's hair, but the term is now used interchangeably with mohair in the market, and both are imitated by products made from silk, wool, and cotton mixed with wool. Genuine mohair is made from the fine, white, silky hair produced by the goats of Angora, in Asia Minor, and has long been a valuable article of export from that locality.

MOHAMMED (mō-hăm'mĕd), **Mahomet** or **Muhammad,** founder of Mohammedanism, born

in Mecca, Arabia, Aug. 20, 570 A. D.; died in Medina, June 8, 632. He descended from a good family of Arabians. His father, Abdallah, died when he was yet an infant, and his mother, Amina, died when he was six years of age. His early training was for commercial enterprises under his uncle, Abu Talib, with whom he made several tours through Syria and Arabia. In the year 595 he was recommended as managing agent to a rich widow named Khadija, whose business he conducted with such faithfulness that a marriage resulted. This union was particularly happy and he began to contemplate religious subjects with much earnestness, retiring annually in the month of Ramadhan to a cave in Mount Hara, near Mecca, for solitary study. At that time Judaism and Christianity both prevailed, but paganism had taken a decline. Several Arabs began preaching at Medina and Mecca and thereby laid a foundation for later activities by Mohammed.

When forty years of age, Mohammed announced to his own family that the angel Gabriel had given a revelation to him, and he accordingly began to preach the new religion. His faithful wife, Khadija, and other members of the family were among the first converts, and shortly after Abu Bekr, an influential Arab, also became converted to the new faith. The high standing of the latter persuaded many citizens of Mecca to believe in the apostleship of Mohammed. The new doctrines became known as those of Islam. Mohammed not only instructed his followers and the people, but from time to time proclaimed divine revelations through immediate contact with the angel Gabriel, and these were later collected and published in the Koran, the sacred writings of this religion. Many of the people looked upon him as a maniac, and, when his opposition to the existing religions became more pronounced and effective, he was endangered by public opposition, but his life was saved by his uncle protecting him for three years in a strong castle. During this time he remained in active meditation. His followers were persecuted severely, many of them fleeing to Abyssinia. When he returned to Mecca, in 621, both his wife and uncle died.

Mohammed was now reduced to poverty and retired for a time to the city of Tajf, but soon after resolved to resort to force in the resistance to his enemies. On June 20, 622, he was compelled to flee from Mecca to Medina, the flight being known as the *Hegira,* which is the beginning of the Moslem era. At Medina he was welcomed by a large following and soon many of his adherents gathered in that city. Shortly after he married Ayesha, the daughter of Abu Bekr, and became recognized as the ruler of the city and the head of several Arab tribes. He not only continued to promulgate prophecies and revelations, but, as his followers increased in number, gave permission to offer armed resistance against infidels, and began to propagate influence by the sword. The long series of battles by which Islamism became established began in 623 at Bedr, where he defeated the Koreish chief, Abu Sofian. On Jan. 13, 624, he defeated a large army at Mecca, where he had gone on the first pilgrimage, and shortly after took possession of that city. He soon gathered a vast army and was recognized as the Prince of Arabia by the infidels, but his followers designated him the Prophet of God. There he destroyed the Kaaba idols, made the Black Stone the object of deep veneration by his sacred touch, and instituted at the holy city the historic magnet that attracts vast pilgrimages.

Not only did Mohammed conquer all of Arabia, but he summoned the King of Persia, the King of Abyssinia, and Emperor Heraclius at Constantinople to embrace the new religion. His death occurred in the midst of preparations to conquer Asia Minor and the Roman Empire. It was in the house of his favorite wife, Ayesha, one of several Arabs whom he had married, that life ceased, and the building was afterward made a part of a mosque to which annual pilgrimages are attracted. It is related that in his last moments he called for a pen to indicate his successor, but that this was prevented by Omar for fear he would appoint his son-in-law Ali instead of Abu Bekr. He had five children by his first wife, a son and four daughters. However, Fatima, the wife of Ali, was the only one to survive him. Mohammed is regarded generally a man of much intellectual power, keen discrimination, poetic imagination, and extensive knowledge of the Bible and popular legends. Although his general education was limited, he had a wide knowledge of the leading and accepted views of his time and was a careful student of men.

MOHAMMED, the name of five sultans of Turkey, the most noted being Mohammed II., who was surnamed *The Great.* He was born in Adrianople in 1430, succeeded his father, Amurath II., in 1451, and died at Nicomedia in 1481. It had been the object of the Turkish sultans for many years to conquer Constantinople, which was the only remnant of the once mighty empire of the Caesars, and this design was uppermost in the mind of Mohammed. Accordingly he organized an army of 258,000 men and a fleet of 320 vessels, with which he began a memorable siege on April 6, 1453. The Greeks under Gian Giustiniani, a noble Genoese, made a gallant defense, but a severe wound compelled their leader to retire from the ramparts. This caused a panic in the city, which was greatly intensified by the sudden death of Emperor Constantine XIII. Thus it became possible for the Turks to devastate the capital city, but it was soon after made their own capital, and their possessions were extended to include a portion of Greece, Servia, and Hungary. Mohammed was the founder of Turkish power in Europe. His influence is still felt, for which he is an object of

reverence by the Turks. He is glorified as the conqueror of two empires, twenty kingdoms, and 200 cities.

MOHAMMED ALI. See **Mehemet Ali.**

MOHAMMEDANISM (mō-hăm'mĕd-ăn-ĭz'm), the name generally applied by Americans and Europeans to the religion established by Mohammed, but which is known among its adherents as *Islam,* meaning entire submission to the decrees of God. The tenets of Mohammedanism embrace many that are allied to other faiths. They include the belief that there is but one God; that He is perfect in knowledge, power, glory, and wisdom; that He is the Creator and Lord of the universe; and that He exists eternally without beginning or end. The Koran is held to be the supreme and incorruptible revelation of God which was given to His people through Mohammed. Other Holy Scriptures in a corrupted form include the Psalms, the Pentateuch, and the Christian gospels. According to Islam, there are ever-living, perfect angels that were created of light. On the other hand, there are evil genii, created of a smokeless fire and subject to death. At the end of time there is to be a general resurrection followed by a final judgment for future rewards and punishment, both being largely of a physical character. All good and evil events are held to be predestined by God, this view having developed into a form of fatalism.

It is held essential among Mohammedans to believe in the prophets and apostles of God, the most noted being Adam, Noah, Abraham, Moses, Jesus, and Mohammed, but the last named is not only the greatest, but the most excellent of God's creatures. Those embracing Mohammedanism are required to observe five duties: have faith that Mohammed is the prophet of the only existing God, prayer, fasting, alms giving, and a pilgrimage to Mecca. Prayer is required at four definite periods each day, and consists of certain adoration and thanksgiving ordained by God and his prophet. Friday is the Sabbath and day of special worship, when all prayers must be said in the mosque. At other times any clean place may be selected for prayer, but in praying the face of the worshiper must be turned toward the Kebla, meaning in the direction of Mecca. The giving of alms depends of course upon the means possessed by the Moslem, each individual being expected to give according to his ability. Fasting occurs in a particular form in the month of Ramadhan from daybreak until sundown, the only exemption being extended to those who are physically unable to abstain from food. The obligation of fasting is an absolute abstinence from all forms of drinking and eating as well as sensual indulgences.

An annual pilgrimage to Mecca is advised, but at least one is a religious duty, and after such pilgrimage the Moslem is designated a *Hadjj.* All forms of intoxicating liquors are forbidden, as well as gambling, sensual enjoyments, and images. On the other hand, veracity, modesty, and piety are commended as virtues. Idol worship is prohibited. Moslems are forbidden the use of blood and are not permitted to eat the meat of swine or of animals that die of a disease. Abu Bekr, the father-in-law of Mohammed, became the successor of Mohammed in 632. He was succeeded in 634 by Omar, after whose death, in 644, Othman became the head of the faith. Shortly after a dispute arose regarding the succession, and Ali, Mohammed's son-in-law, was selected by the Arabs and Moaviah was chosen by the Syrians. From this division arose two Mohammedan sects known as the Sunnites and the Shiites. The former are considered orthodox Mohammedans, and the latter hold that Ali was the first and rightful successor of Mohammed. The Sunnites are most numerous in Turkey, Turkestan, Arabia, and Africa, while the Shiites predominate in India and Persia. Besides these may be mentioned other minor sects, such as the Assassins and the Nosairis, but all may be generally grouped as Sunnites and Shiites. There are about 250,000,000 Mohammedans in the world. No other faith has offered such a stubborn and persistent resistance to the advance of Christianity as the religion of Mohammed. See **Koran.**

MOHAVE (mō-hä'vā), a tribe of Indians found in North America, residing in the lower part of the valley of the Colorado River, both in Arizona and California. They engage in stock raising and agriculture, giving considerable attention to the cultivation of corn, melons, beans, and pumpkins. Many are skilled in making baskets, pottery, and beadwork. Their houses consist of structures built of logs covered with sand. They are warlike, practice tattooing, and cremate the dead. At present they number about 2,175, including 650 who are now on the Colorado River Reservation of Arizona.

MOHAWK (mō'hąk), a river of New York, rises in Lewis County, flows in a southwesterly direction to Rome, and thence flows southeast and joins the Hudson opposite Troy. The river is about 135 miles long, has an abundance of water power, and is paralleled in its entire course from Rome to Troy by the Erie Canal. Among the towns on its banks are Rome, Utica, Cohoes, Schenectady, and Waterford.

MOHAWKS, an Indian tribe of North America, one of the Five Nations of the Iroquois, and originally located in the Mohawk valley. The Dutch and English secured their friendship in the early settlement of New York, and during the French and Indian War they proved valuable allies to the colonists. In the Revolutionary War they adhered to the British, their chief, Brant, rendering effective service to the latter. The Bible was translated into their language, as well as several prayer books and histories. More recently a grammar and dictionary were written. The tribe includes many

representatives of more than ordinary ability. After the Revolutionary War most of the Mohawks settled on the Grand River in Canada.

MOHICANS (mō-hē'kạnz), or **Mohegans,** an Indian tribe, located originally along the Hudson River, classed with the Algonquin family. The Mohawks compelled them to settle along the Connecticut River in 1628, but later a portion returned to their former possessions and others went eastward and became known as the Pequots. They were generally friendly to the English in their contests with the French, but later they sided with the Americans. After the Revolution they divided and formed settlements in New York, Wisconsin, and Kansas. Many of the Mohicans have become assimilated by the whites, and are now represented by descendants noted for their educational and industrial skill. The "Last of the Mohicans" is a novel written by Cooper that has made the name famous.

MOKI (mō'kē), or **Hopi,** a tribe of Indians found in Arizona, classed with the Pueblo branch of the Shoshone stock. They live principally in seven villages located in the northern part of Arizona and have been little influenced by the customs of the whites. These Indians are chiefly farmers, engaging in the cultivation of beans, corn, and pumpkins. They practice the celebrated snake dance, in which the performers have living serpents in their mouths. Wallpie and Oraibi are their principal villages and these, like other centers of the tribe, are located in high altitudes, being reached only by steep and difficult trails.

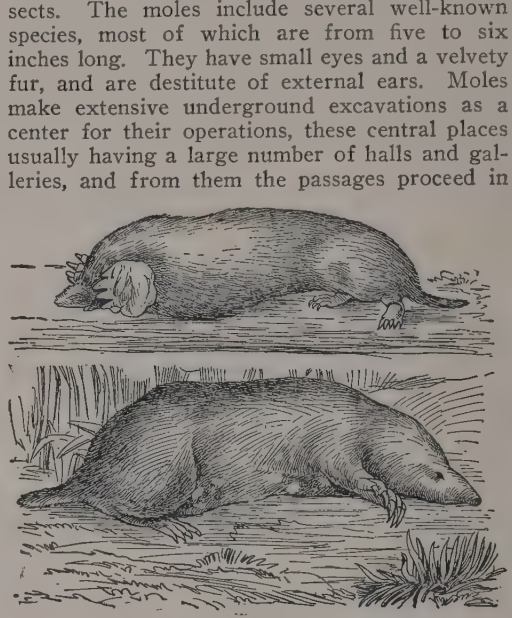
MOLASSES (mō-lăs'sĕz), a brown syrup obtained in refining sugar. It is uncrystallizable and is secured from draining crystallizable sugar. Molasses consists generally of thirty-six per cent. inconvertible sugar, thirty-six per cent. crystallizable sugar, twenty per cent. water, five per cent. organic acids and extractive, and three per cent. mineral matter. Large quantities of cane molasses are produced in the Southern States, but *sorghum,* a form of molasses, is made in all the states and many localities of Canada. Louisiana takes the highest rank in the production of molasses.

MOLD, the name of any fungus growth on food, clothing, walls, gum, and other substances. The term is applied especially to such growths as form a woolly coating on decaying vegetable matter, or in moist, warm places. Mold is a vegetable growth of a low type.

MOLDAU (môl'dou), the largest river of Bohemia, having its source in the Böhmerwald, on the frontier of Bavaria. From the source it flows toward the north and joins the Elbe after a course of 275 miles. The Moldau courses through a fertile region. It is important on account of its fisheries and navigation, and on its banks are the cities of Budweis and Prague. About half of its course is navigable.

MOLDAVIA (mŏl-dā'vĭ-ȧ). See **Rumania.**

MOLE, an insectivorous animal of the family *Talpaidae.* It is a small mammal, has very broad fore feet adapted for digging, and burrows immediately below the surface of the ground in search of worms and the larvae of insects. The moles include several well-known species, most of which are from five to six inches long. They have small eyes and a velvety fur, and are destitute of external ears. Moles make extensive underground excavations as a center for their operations, these central places usually having a large number of halls and galleries, and from them the passages proceed in



COMMON MOLES.

all directions. The central rooms, in which they rear their young, are connected by channels with places where they secure water. The earthworm is the normal food of moles, but they feed greedily on all kinds of flesh, such as mice, frogs, and even small birds. The common mole native to America is distributed from Canada to the Gulf, and allied species are found in various parts of both hemispheres. In some localities it does damage to pastures and lawns and injures many kinds of growing plants by disturbing the ground immediately surrounding the roots. The *shrew mole* is found largely in North America and the *cape mole* is native to South Africa. Moles increase with great rapidity. From four to six young are produced at a time, twice each year. The adult of the common mole is about six inches long, of a blackish color, and the tail is one inch long.

MOLE CRICKET, the name of the burrowing cricket, so called from its habit of constructing channels under the surface of the ground. It is large and covered with a velvety down. All of its life is subterranean. It moves about from place to place by digging burrows, in which it lays the eggs and rears the young. Many species are native to the warmer parts of America, especially to Porto Rico and the West Indies. From 200 to 400 eggs are laid by the female, which watches over the young until their first molt, when they dig burrows for themselves. In some parts of South America these

insects are injurious to plants, since their burrows often destroy the roots.

MOLECULE (mŏl'ê-kūl), the smallest parts into which a body can be divided without destroying the substance of it. If the forces which keep the molecules intact are overcome, they may be broken up into *atoms,* which are regarded the primary part of molecules, hence are not further divisible. The molecules are so small that they cannot be seen by the most powerful microscope. Using the thickness of the film in soap bubbles as the basis, Lord Kelvin estimated that if a globe of water the size of a football were magnified to the size of the earth the molecules would range in size between small shot and footballs. According to this estimate, the number of molecules in a cubic centimeter of gas at the ordinary pressure and temperature is equal to 19,000,000,000,000,000,000. By *molecular weight* is meant the relative weights of molecules. The *molecular forces* are those that bind together the atoms into molecules, hence, by this union they form matter in a gaseous, liquid, or solid state. See **Atoms.**

MOLIÈRE (mô-lyâr'), **Jean Baptiste Poquelin,** eminent dramatist, born in Paris, France, Jan. 15, 1622; died Feb. 17, 1673. His family name was Poquelin and Molière was assumed as the stage name. He descended from a family of tradesmen, received a liberal education, and, after studying law, gave up that profession to follow the career of an actor. His first efforts at Paris were unsuccessful, but he soon made a tour of the provinces, where he attained to much popularity. In 1658 he made a second venture at Paris, when he introduced several comedies and later established a theater. In the following year he wrote "Précieuses Ridicules," which embodies a fine satire on the language, dress, and thought of his time, including criticisms on the character of learned females. This not only added greatly to his reputation, but was instrumental in bringing about several social reforms.

Many of the plays given by the theatrical troupe under the direction of Molière were prepared by Racine and Corneille. Later he drew inspiration for his own productions from the literature of Italy and Spain. Every year up to 1673 he produced one or more gems of literature, some of which have survived and are still popular. In his "Tartuffe" he made an attack upon hypocrisy in connection with religious pretensions, and as a result it was forbidden to be presented for some years, a fact of which rival actors and enemies took advantage. Molière was popular with Louis XIV., who selected his performances for royal company and later pensioned the director. Few names have a brighter luster in the literature of comedy than that of Molière. His productions are admired extensively, all of them possessing originality and studied design. He was at first refused burial by the Archbishop of Paris because that official regarded him a reviler of the clergy, but permission was granted at the request of the king, and a century after his death a lifelike bust of him was placed in the French Academy. Among his most celebrated productions are "The Festival of Peter," "The School for Women," "Tartuffe," "George Dandlin," "Misanthrope," "Learned Women," "Le Malade Imaginaire," and "Don Juan."

MOLINE (mô-lēn'), a city of Illinois, in Rock Island County, on the Mississippi River, immediately north of Rock Island. It is on the Chicago, Burlington and Quincy, the Chicago, Rock Island and Pacific, and the Chicago, Milwaukee and Saint Paul railroads. The noteworthy buildings include the Le Claire Hotel, public library, high school, hospitals, and many fine churches. An abundance of water power is derived from the river. Bituminous coal is mined in the vicinity. The manufactures include wagons, machinery, stoves, paper, musical instruments, flour, and farming machinery. It has electric street railways, systems of waterworks and sanitary sewerage, and a large trade in produce and merchandise. Population, 1920, 30,709.

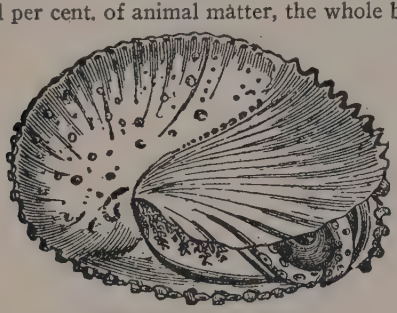
MOLINO DEL REY (mô-lē'nô děl rā'), **Battle of,** an engagement of the war between Mexico and the United States, fought a short distance from the City of Mexico on Sept. 8, 1847. General Worth commanded a force of 3,500 Americans and at early dawn stormed the massive stone buildings of Molino del Rey, which were defended by 10,000 Mexicans under Santa Anna. The Mexicans were driven from their position by heavy firing and the American loss, about 800, was heavier in proportion than in any other battle of the war. The Mexicans lost 700 by capture and 3,000 by death or injury. This battle is regarded as an American defeat by the Mexicans, since the latter look upon it as a movement against Chapultepec.

MOLLAH (mŏl'lä), a title applied by the Turks to any one having acquired position in public worship under the Koran, or attained to respect because of personal purity. Such a title is applied from common habit. It corresponds to the English terms master and excellency.

MOLLUSCA (mŏl-lŭs'kä), a subkingdom of animals, embracing a division of the invertebrates. It includes especially the species which have an unsegmented bilateral body and four nerve cords arranged in pairs, two visceral and two pedal, with lateral and medial abdominal ganglia. The division embraces the oysters, cockles, snails, limpets, slugs, and many others. Most mollusks are supplied with shells, but many have a muscular sac, while others have a body quite naked and unprotected. Those with shells are commonly called *shellfish.* They are classified as *univalves, bivalves,* and *multivalves* The limpet is a univalve and has a shell constructed of a single piece. Many of this class of animals have shells formed like cups, or as if spirally wound on an axis, but they always consist of a single piece. Mollusks of the bivalve

class are so named from the two parts of their shells, which are attached by a hinge, and represented by the oyster and cockle. The shell of multivalves is composed of a number of pieces, but this class is not numerous. In the female of the genus argonauta, or paper nautilus, the shell is remarkably beautiful.

Carbonate of lime is the principal constituent of the shells of mollusks, which contain only a small per cent. of animal matter, the whole being



ARGONAUT IN ITS SHELL.

secreted by an interior tegument of soft texture. The different species are variously constructed, though generally the blood is quite colorless; a mouth, gullet, stomach, and intestines constitute the digestive system; and respiration is effected quite variously. The bivalves and some of the univalves breathe by gills and some univalves, as in the snail and slug, have an air chamber so constructed of organs that the air is breathed directly. Many of the mollusks have an organ of locomotion, commonly called a foot, which may be protruded from the lower part of the shell, as in the cockle, clam, and snail. In this way they are able to propel themselves forward by burrowing in the ground. Oysters are unable to move, owing to the foot being rudimentary, while the octopus and cuttlefish are supplied with locomotive organs in the form of tentacles around the mouth.

Clams, oysters, and mussels are known as *acephala,* meaning without a head. The nautilus, octopus, and cuttlefish have two great eyes

ARGONAUT SWIMMING.

and from eight to ten tentacles or arms surrounding the mouth. They are called *cephalopods,* meaning head-footed. Many thousand species of mollusca have been studied. They are distributed throughout every clime and nearly every part of the world.. The number of species is estimated at 21,500. Fully 20,000 extinct species have been classified, being possible to study them on account of the reliable means afforded by the comparative indestructibility of the shells when buried in the various strata of deposits formed by the action of water. Some forms of mollusks inhabit fresh water and others live on the land, but the larger species are found in salt water. Many mollusks leave remains that almost defy decay.

MOLLY MAGUIRES (mŏl'lў mȧ-gwīrz'), a secret society organized in 1843 in various portions of Ireland, whose purpose was to attain advantages by intimidating officers and citizens. In 1867 branch organizations were formed in the anthracite coal districts of Pennsylvania, where the members sought to gain advantage in political and financial matters by terrorizing and intimidating their opponents. Detectives operated among them for some time with more or less effect. The organization was finally broken up in 1887 by the execution of twenty members on conviction of murder.

MOLOCH (mō'lŏk), or **Molech,** an idol worshiped among the Ammonites and later in Judah. During the Hebrew monarchy the special place to worship Moloch was in the valley of Hinnom, where children were sacrificed in the fire of Moloch within the reigns of Kings Ahaz and Manasseh. It is thought that children were originally offered as a sacrifice to this idol, but later, when humane sentiment began to displace cruel superstition, the practice gradually became extinct.

MOLOKAI (mō-lō-kī'), one of the Hawaiian Islands, situated north of Lanai, noted principally on account of its colony of lepers. The island is thirty-eight miles long and about eight miles wide. It has an agreeable and a healthful climate. Lepers from all parts of the Hawaiian Islands have been located on Molokai, but the colony is separated entirely from the other portion of the populace. Population, 1910, 1,791.

MOLTKE (mōlt'kę), **Helmuth Karl Bernhard, Count von,** field marshal of Germany, born at Parchim, Mechlenburg-Schwerin, Oct. 26, 1800; died April 24, 1891. He descended from a noted family, secured military training at Copenhagen, entered the Prussian service in 1822, and later studied in the Military Academy at Berlin. In 1835 he traveled extensively in Southern Europe, was retained as an organizer by the Sultan of Turkey, and while there effected a complete reorganization of the Turkish army. He took part with the Turkish expedition in Syria against Mehemet Ali and Ibrahim Pasha of Egypt, in 1839, but soon after returned to Prussia. In 1847 he became general

COUNT VON MOLTKE.

commander on the Rhine, and was chief of the general staff at Berlin after 1858, in which position he effected a general reorganization of the Prussian military forces. He witnessed the war between Austria and Italy for the purpose of further reorganizing the German army, and in 1864 sketched the campaign against Denmark. The activities against Austria in 1866 were efficiently planned by Moltke. He personally directed affairs at Koniggrätz. Later he directed the advance of the Prussian army against Olmütz and Vienna, and for efficient service received the Order of the Black Eagle. In the war against France he was practically the commander in chief. The efficient manner in which he planned the campaign caused him to be made chief marshal of the German Empire, in 1871, and the following year he was created count. He was generally regarded the leading strategist of his time. He received from Russia the Order of Saint George and from Germany the Order of the Iron Cross. His son, Count Helmuth von Moltke (1848-1916), held an important command in the operations against France, 1914 and 1915.

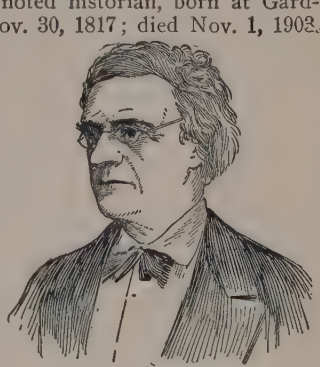
MOLUCCAS (mō-lŭk'kȧz), or **Spice Islands,** the name applied to a division of the Malay Archipelago. This group is situated between the Philippine Islands on the north, the Sunda Islands on the south, New Guinea on the east, and Celebes on the west. It has an area of 43,864 square miles. The entire group includes several hundred islands, of which the principal ones are Gilolo, Ceram, Booro, Morty, Mysole, and Mangola. They are generally divided into two divisions: the northern Moluccas and the southern Moluccas, the former being governed directly by the Dutch and the latter through native sultans or rulers. However, all of the group is a possession of the Netherlands and is divided into the four residences of Ternate, Amboina, Banda, and Menado.

The Moluccas are of volcanic origin and contain a number of lofty mountains, but the soil is generally fertile and the climate is favorable. Earthquakes are of frequent occurrence. They have a considerable trade in live stock, tropical fruits, valuable timber, fish, beeswax, cloves, birds' nests, nutmegs, tea, and various spices. Among the native animals are the birds of paradise, the flying opossum, gorgeous butterflies, corals, and many varieties of birds of song and plumage. The Moluccas were first claimed by the Portuguese in 1521, but in the 17th century they became tributary to Holland. As a whole they are a valuable possession, supplying many useful articles of commerce at small expense. Most of the inhabitants are natives of the Malay and Polynesian races. The European population is very small. Population, 1922, 412,910.

MOMBASA (mŏm-bä'sä), or **Mombaz,** a seaport town of Africa, capital of British East Africa, on a small island off the coast, about 150 miles north of Zanzibar. It is connected with the mainland by a railway and is important as a naval coaling station and commercial center. The harbor is deep and well improved, but the buildings are poorly constructed. It has a large trade in maize, hides, ivory, copra, and fruits. The Portuguese first visited the region under Vasco de Gama in 1497. It remained Portuguese territory until 1824, when it passed to the English. Ex-President Roosevelt began his tour of Africa from Mombasa in 1909. Population, 1922, 28,508.

MOMENTUM (mō-mĕn'tŭm), the power of overcoming resistance possessed by a body in motion, which may be defined as the product of the mass and its velocity. To measure any force we must know what quantity of matter is moved and what velocity it possesses in a unit of time, the product of the two being the momentum. Thus, a ball of four pounds, moving uniformly at the rate of eighteen feet in a second, has double the momentum of one weighing three pounds and moving at the rate of twelve feet per second, for $4\times18=72$ and $3\times12=36$, or half as much. The momentum of a moving body and the force with which it strikes an object are the same in amount.

MOMMSEN (mŏm'zĕn), **Christian Matthias Theodor,** noted historian, born at Garding, Germany, Nov. 30, 1817; died Nov. 1, 1903. He studied at Kiel, traveled in France and Italy to study Roman inscriptions, and was chosen professor of jurisprudence at Leipzig in 1848. Four years later he became professor of Roman law at Zurich, accepted a like position at Breslau in 1854, and was made professor of ancient history at Berlin in 1858. He was appointed perpetual secretary of the academy at Berlin in 1873, and during his leisure devoted himself with much ardor to research and writing on historical subjects. Mommsen is regarded one of the most thorough scholars of recent times. His knowledge of language, mythology, antiquities, law, history, and the sciences is recognized as both extensive and profound. Many of his writings have been translated into Russian, French, Italian, English, and other languages. Among his productions are "Roman History," "The Dialects of Lower Italy," "Political Rights of Rome," "Caesar and the Senate," "Provinces of the Roman Empire from Caesar to Diocletian," "Roman Chronology," and "History of Caius Martius Coriolanus."



C. M. T. MOMMSEN.

MOMPÓS (mŏm-pŏs'), or **Mompox,** a city of Colombia, in the department of Bolivar, on

the Magdalena River, 108 miles southeast of Cartagena. It has a college and several elementary schools. Formerly it was the seat of a large river trade, but the channel became changed by a flood in 1868, and since only small boats have been able to reach the place. The manufactures consist of tools, jewelry, and musical instruments. Population, 11,200.

MOMUS (mō'mŭs), the son of Night and the god of mockery and censure. It is said that he was expelled from heaven because of censuring the gods. In statuary he is represented in the attitude of raising a mask from his face, holding in his hand a small image.

MONACHISM (mŏn'â-kĭz'm). See **Monastery.**

MONACO (mŏn'â-kō), a small principality of Europe, located nine miles northeast of Nice, between the French department of Alpes-Maritimes and the Mediterranean. The area has consisted of eight square miles since 1861, when the Prince of Monaco transferred the remainder of the territory to France in consideration of $800,000. It has a mild and healthful climate. Trade in aloes, fruits, and cereals is the chief industry, but the people engage largely in the enterprise of accommodating tourists. The inhabitants are practically free from taxes, since sufficient revenues are raised by the sale of commercial and gambling privileges at Monte Carlo. The legislative and executive authority is vested in the prince. Monaco, the capital, has a population of 3,308 and is a pleasant resort for tourists. The Genoese House of Grimaldi received a grant of Monaco in 980. Subsequently it was placed under the protection of Spain, France, and Sardinia. The independence of the principality is now generally recognized by the nations of Europe. Population, 1906, 15,810; in 1921, 23,121.

MONARCHY (mŏn'ârk-ў), a form of government administered by a monarch, in which the supreme authority is vested in a single person. Monarchies are either absolute or limited. An *absolute* monarchy is one in which the sovereign has absolute authority and in him is vested the power to make, interpret, and execute the law according to his own will. Persia, Abysinnia, and Morocco are among the absolute monarchies. A *limited* monarchy is a government in which the sovereign is restrained by a constitution and established laws as is the case in Italy, Bulgaria, Spain, Sweden, England, and other European countries. In a limited monarchy the power to make laws is vested in a legislative department, the power to interpret them is in the courts, and they are executed by the sovereign. A *hereditary* monarchy is a government in which the sovereign obtains title to the throne by birth, as in England and Japan, and an *elective* monarchy is one in which the subjects elect a sovereign for life, as was the case in Poland before its partition. The principal terms used to signify the position of a monarch include *emperor, king, kaiser, czar, sultan,* and *shah.* In countries recognizing female succession the equivalent feminine appellations, as *empress* or *queen,* are applied.

MONASTERY (mŏn'ăs-tĕr-ў), an institution occupied in common by individuals under religious vows of seclusion. Certain classes who have taken vows of monastic seclusion, or monachism, have been mentioned from periods long before the Christian era. They are still common to the Buddhists and Brahmans, among whom are many individuals who take the vow to practice a life of religious piety as recluses. It is thought that the first Christian monastery was founded in Upper Egypt, in 305, by Anthony the Great, who organized the institution by calling around him hermits and held them together by conducting exercises of devotion in common and encouraging industrial enterprises among the members. A monastic colony was founded soon after by his disciple, Pachomius, on the island of Tabenna, in the Nile, which, in 348, numbered 7,500 persons.

Christian monasteries were established as early as the 4th century. They were first instituted on the northern shore and the islands of the Mediterranean, especially in Italy. Saint Patrick and others, in the 5th century, founded many monasteries in Ireland. In the 6th century Saint Benedict introduced monastic vows that led to a spread of learning, piety, temperance, and industry, and from his efforts sprang the influential Benedictine rule, under which strides of advancement were made both in spiritual and physical relations. Much of the early education of Europe was fostered under monasticism. At the time of the Crusades the monasteries became quite generally independent of all superintendence, except that of the Pope. Later such orders as the Franciscans, Dominicans, Carthusians, Capuchins, Cistercians, and Jesuits became factors in education.

After the Reformation the number and influence of monasteries diminished. The institutions are wholly abolished in some countries as harmful to the government. Joseph II. of Germany annulled most of the monasteries in 1781, while those remaining were prohibited from being influenced by foreign sovereigns. France took a like step in 1789, but since 1880 institutions of this character are permitted. In 1875 the monasteries of Germany were limited to those providing for the sick. Similar, although less severe, restrictions have been placed upon them in Spain, Russia, Portugal, and Italy. In Canada, the United States, and many other countries of America there is no restrictive influence, but several of the Catholic countries of South America have either abolished or limited them. The monastic vows include the three obligations of poverty, obedience, and chastity. The vow of *poverty* places an obligation upon a monk under which he is unable to hold property, though in some of the orders, as the Au-

gustines and Carmelites, a sufficient amount for support may be held by members. On the other hand, the vow of *obedience* makes it necessary to comply with the established rules of the organization and that of *chastity* requires total abstinence from association with the opposite sex.

MONASTIR (mŏn-ȧs-tēr′), or **Bitolia,** a city of European Turkey, in Macedonia, ninety miles northwest of Salonica. It is situated on an important route of trade between northern Albania and the Aegean Sea. Among the chief buildings are the military hospital, the central railroad station, and many mosques. The manufactures include woolen and silk goods, carpets, jewelry, and utensils. At present it is in an illy kept state, but during the prosperity of ancient Greece, when it was known as Pelagonia, it was both substantially built and important as a strategic point. The Turkish government maintains a military force at Monastir, and it is the residence of the governor-general. The inhabitants are chiefly Greeks and Bulgarians. Population, 1922, 45,500.

MONBUTTU (mŏn-bụt′tōō), or **Mangbuttu, a region** in the central part of Africa, located west of British East Africa and included chiefly in the Congo Free State, of which it forms the northern part. It consists mainly of an elevated tableland and is drained by the Gadda and the Kibaly, which form the Welle River. The region includes about 4,000 square miles and is inhabited by natives who practice polygamy and cannibalism. Slave traders have carried off many of the inhabitants, who engage in raising cereals, fruits, and live stock. Population, 1,050,000.

MONCTON (mŭn̲k′tŭn), a town of New Brunswick, in Westmoreland County, 88 miles northeast of Saint John. It is located on the Petitcodiac River, which is navigable to this place, and on the Canadian National Railway. It has a fine harbor, railway machine shops, and a large trade in lumber and agricultural products. The manufactures include flour, cotton and woolen goods, leather, ironware, and machinery. The streets are well platted and improved. Electric lighting, telephones, waterworks, and sewerage are among the public improvements. Population, 1921, 17,488.

MONDAY, the second day of the week, so named by the Romans from the moon. The Monday before Lent is called *Blue Monday.* When Easter falls on Monday, it is known as *Black Monday,* from the circumstance that the forces of Edward III., while encamped before Paris, suffered from rain and cold on Easter Monday in April.

MONET (mô-nȧ′), **Claude,** landscape painter, born in Paris, France, Nov. 14, 1840; died Dec. 5, 1926. At an early age he drew inspiration from nature in executing both distinct coloring and outline. Few painters have equaled him in ability to reproduce the effects of air and light, to give to works of art original and natural coloring. He is classed as the leader of the impressionist school. Much of his work was done in Giverny, a village in Normandy, where he maintained a studio and was surrounded by an enthusiastic group of followers. His painting entitled "Mouth of the Seine at Honfleur" is one of great excellence and reflects his earliest style. "The Orchard" is a fine landscape painting, in which the artist produced a beautiful effect in coloring and details the vibrations of light. Other paintings include "On Cape Martin, Near Mentone," "Vessels Leaving Havre," "Fontainebleau Forests," "Church of Verna," "Low Tide at Pourville," and "Snow at Port Villers."

MONEY, any material that by agreement serves as a common medium of exchange and measure of value in trade. It is quite difficult to devise a definition to describe all the different ways in which money may be used to serve a useful purpose in an economic sense, but it is generally agreed that as a circulating medium it constitutes the standard by which the value of all other commodities is measured, that it is an equivalent for commodities, and that to be utilized as a medium of exchange for commodities it must bear certain marks by which it may be recognized.

Various articles have been used among primitive peoples to effect exchange. The earliest system was one of barter, in which one commodity was exchanged for another, but in some regions cattle, shells, skins, feathers, beads, grain, sugar, tobacco, nails, postage stamps, and many other objects were used as money. Many of the semisavages accepted beads, wampum, and cowries by custom as money at an arbitrary value. The first mention of a medium of exchange in the Bible is in Genesis, where it is said that money was used by Abraham, when he secured a field as a sepulcher for Sarah. The coinage of money has been ascribed at an early date to the Corinthians, the Lydians, and the people of India. It is certain that coins were employed in the 6th century B. C. Paper money came into use in Europe in the 14th century, but it was employed to some extent in Europe at a much earlier date.

The utility of money as a medium of exchange is easily understood. Without it there would be much difficulty in effecting commercial enterprises, and we would have to resort to the barter system recognized by early peoples in exchanging one commodity for another. As a measure of value the quantity of money must be properly adjusted to furnish the best facilities for trade, since the amount in circulation has an important effect upon the industries and the price of commodities. Where the state of society is otherwise perfectly stationary, an increase in the volume of money brings about a smaller purchasing power, thus increasing the price of commodities, and, on the other hand,

a decrease in the volume has the contrary effect. This is based upon the well-known law of *supply* and *demand*. In addition there must be stability in the value of money, otherwise it might decrease or increase as a valuable possession within a short time. To secure the necessary stability in value, it is necessary to have a government organized on a proper and durable basis, or to make the money quite largely of a material representing much value in a small bulk. Paper money depends for its stability wholly upon the government back of it, while coin represents a value aside from the monetary functions which it serves.

Among the necessary elements that should characterize any substance used as a medium of exchange are that it should have value aside from its use as money, comprise much value in small bulk, possess close approximation to constancy of value, be devisible into small portions without loss, possess great durability, be in practically universal use by the leading nations, and possess capability of receiving and retaining stamps to indicate its current value. Both gold and silver have all these characteristics, while all other metals fail in answering the requirements in one or more respects. For this reason both gold and silver are used chiefly as standard money, some countries preferring a bimetallic and others a single or monometallic standard. Besides the principal coin constituted of gold and silver, there is token money for change made of such metals as nickel and copper. It is generally aimed to put a value equal to the monetary value in *standard* money, while *token* money is not generally a legal tender for more than small amounts, and represents an exchange value far greater than that of the metal of which it is made. By *legal tender* is meant that the money possesses attributes which are sufficient to discharge a debt. Token money is usually a legal tender for only a small amount, because it becomes cumbersome when presented in payment of a large obligation.

Paper money is based either upon the credit of the nation or upon coin deposited in the national treasury. The so-called greenback money is an example of the former and gold and silver certificates of the latter. Both in a system of banking and a national currency it has been found that a small amount of coin is adequate to supply the basis for a much larger system of credit money, for the reason that very few individuals care to exchange the more convenient currency for gold and silver coins. By *money unit* is meant the representative denomination used in making exchange, which, in Canada, Mexico, and the United States, is the *dollar*. The *franc* is the money unit of France, Switzerland, and Belgium; the *mark* of Germany; the *pound sterling* of Great Britain; the *ruble* of Russia; the *lira* of Italy; the *crown* of Austria-Hungary; the *krona* of Sweden, Norway, and Denmark; the *milreis* of Brazil and Portugal; the *rupee* of India; the *guilder* of the Netherlands; the *peseta* of Spain; the *piaster* of Turkey; the *yen* of Japan, and the *tael* of China. See **Banking; Bimetallism; Credit; Currency Reform; Mint,** etc.

MONEY, Hermando de Soto, public man, born in Holmes County, Miss., Aug. 26, 1839. He studied at the University of Mississippi and became a lawyer and planter. In 1861 he entered the Confederate Army, serving until 1864, when he retired because of defective eyesight. He was elected to Congress in 1874 and served continuously until 1885. In 1892 he was again elected to Congress, serving four years. He was chosen United States Senator as a Democrat in 1897 and was reëlected in 1899 and in 1905. He died Sept. 18, 1912.

MONGOLIA (mŏn-gō'lĭ-ȧ), an extensive region of Asia, situated between Asiatic Russia and China proper. It stretches from Manchuria westward to the Altai Mountains and Eastern Turkestan. The area is estimated at 1,250,000 square miles, all of which comprises a colonial possession of the Chinese Empire. It includes the Desert of Gobi, but a large part of the region is fertile and productive. Barley, wheat, millet, sheep, cattle, and horses are the chief products. Many wild animals roam across the vast stretch of unoccupied country, such as sables, deer, wolves, mountain goats, and wild camels. The people are nomadic in their habits, moving from place to place as they graze their herds. Buddhism is the chief religion. The lamas or priests receive support from the Chinese government. Population, about 2,500,000. See **Mongolians.**

MONGOLIANS (mŏn-gō'lĭ-ȧnz), in ethnology, one of the five great races of the world. The term was originated by Blumenbach and, when the five races discriminated by him were reduced by Cuvier to three, the latter adopted the name. Among the principal characteristics are a square head, a flattish face, and a flat nose. The eyelids are obliquely turned up at their outer angle, the cheekbones are projecting, and the chin is quite prominent. The hair is black and straight, the face and body are yellowish or olive, and the stature is medium. This race was so named from Mongolia, a large region in the east central part of Asia, stretching from Turkestan to Manchuria. The inhabitants of this region lead a nomadic life, especially in the portions occupied by the Desert of Gobi, or Shamo. Other members of the Mongolian race, and who are thought to have descended from the natives of Mongolia, are the Turks, Chinese, Kalmucks, Tartars, Japanese, Burmese, Hungarians, Finns, Eskimos, and Siamese. The Mongols constitute about one-third of the population of the earth, the total number of different branches being estimated at 560,500,000.

The Mongols proper are considered typical of the Mongolian race, but their early history

is wrapped in doubt and tradition. Their original seat seems to have been in the vicinity of Lake Baikal, in Siberia, and the earliest notice in history appears in the year 619 A. D., when they are connected historically with the T'ang dynasty of China. In the early part of the 13th century they commenced to attain political power. Genghis Khan, in 1206, began to organize the different tribes into one vast state with the view of conquering the earth. His immediate descendants, especially his grandson, Kublai Khan, succeeded in the consummation of at least a portion of the original design. The whole of China was conquered and a Mongol dynasty came into possession of the Chinese throne, which continued to reign until the 14th century. A great horde of Mongols invaded Russia in 1237, whence they made incursions into Hungary and Poland. In 1241 the Hungarians were crushed completely in a battle at Pesth. When Marco Polo visited China, in the latter part of the 13th century, he witnessed the greatest power of the Mongol Empire under Kublai Khan. Its scope of territory included the vast region from Poland to the China Sea, and extended from the Indian Ocean to the northern part of Siberia.

When the Mongol dynasty of China was overturned by a revolution in 1368, it was succeeded by the Ming dynasty, and the Mongols proper were compelled to fall back toward their original possession in the vicinity of Lake Baikal. The next powerful warrior was Tamerlane, known also as Timour and Timurlenk, a descendant of Genghis Khan. He collected many of the Mongol tribes in a new government, of which Samarcand became the capital in 1369. Tribal differences and the spread of Buddhism in the East and Mohammedanism in the West operated to divide the different tribes. After the death of Tamerlane, the government became gradually weakened and in 1468 it was divided into several minor states. The great Mongol Empire of India was the last effort of the Mongols. It was founded by Baber, a descendant of Tamerlane, in 1519, and in 1857 every vestige of it disappeared. The Mongols lost their importance in the 16th century, when they were absorbed largely under separate khanates by different peoples, and their original territory became a part of the Chinese Empire in the 17th century.

The Chinese, who may be considered the typical Mongolians, are represented most largely in Asia, but many have emigrated to Australia, North America, and other continents. Their immigration into the United States has been prohibited as injurious to the industries and as generally undesirable. The term *Yellow Peril* originated from a supposed movement of the Mongolians to unite for military and commercial purposes as against the Americans and Europeans. The language of the Mongols is classed with the Turanian, and their literature and tradition are devoted chiefly to the empires founded by Genghis Khan and Tamerlane. However, there are various translations from the Chinese and Japanese that have entered to a considerable extent into general literature.

MONGOOSE (mŏn'gōōs), a species of ichneumon, native to India and closely allied to the ichneumon of Egypt. The body is weasel-like and from fifteen to seventeen inches long, and the tail measures fourteen inches. It has been domesticated for the purpose of killing snakes, a feat it performs with much adroitness and safety to itself. The mongoose sucks the blood of its prey, such as birds and reptiles, and leaves the body uneaten. See **Ichneumon.**

MONIER-WILLIAMS (mō'nĭ-ēr), **Sir Monier,** author and educator, born in Bombay, India, Nov. 12, 1819; died in Oxford, England, April 11, 1899. His father was surveyor general in India at the time of his birth, and, after receiving an elementary education, he studied at King's College, London, and at Oxford. In 1844 he became professor of Sanskrit in the East India College, at Haileybury, a position he held until 1858, when he was made a professor at Cheltenham. He was elected to the chair of Sanskrit at Oxford in 1860, where he remained to the time of his death. He was the founder of the Indian Institute at Oxford. Several honorary degrees were conferred upon him. He was the author of many excellent works. Among his writings are "English-Sanskrit Dictionary," "Indian Epic Poetry," "Sanskrit Grammar," "The Holy Bible and Sacred Books of the East," "Buddhism and Brahmanism," "A Study of Sanskrit in Relation to Missionary Work," and "Reminiscences of Old Haileybury College."

MONITOR (mŏn'ĭ-tēr), the name of a genus of large lizards, some of which are nearly as large as alligators. The monitor of Africa, found in large numbers in the valley of the Nile, has a length of six feet, though nearly half of the body consists of a slender tail. It has dark blotches distributed over the gray back. The head is long, the tongue is fleshy and extensile, and the body is covered with scales. It feeds on the eggs of aquatic birds and crocodiles, and is so named from the erroneous belief that it acts as a monitor to warn the unwary of the approach of crocodiles. Several species of lizards native to Australia and South America closely resemble the true monitors.

MONITOR, the name of an ironclad vessel originated by John Ericsson in 1861. It was built under an order from the United States government and was completed in about three months. The guns were placed in a revolving turret or tower, and the wooden frame of the ship was covered with plates of iron. This ingenious vessel was able to cope with the *Virginia,* a Confederate warship which had formerly been called the *Merrimac.* The battle took place on Hampton Roads, Va., and both

vessels withdrew after an engagement of four hours, but the contest demonstrated the efficiency of vessels built on the type of the *Monitor.* Immediately several European countries began the construction of similar vessels. Monitors are now constructed with one or two revolving turrets, in each of which one or more powerful guns are located, and the whole is designed to secure a large amount of power with the least possible exposure to the enemy.

MONITOR AND VIRGINIA.

Modified devices are employed extensively on the various ironclads, but all are patterned more or less after the principles employed by Ericsson.

MONK (mŭnk), **George,** Duke of Albemarle, noted general, born in Devonshire, England, Dec. 6, 1608; died Jan. 3, 1670. He was the son of Sir Thomas Monk, secured most of his educational training in Holland, but returned to England in 1638 to engage with the army against the Scotch, and was promoted to the rank of lieutenant colonel. In 1642 he accompanied an expedition to crush the Irish rebellion, and in 1644 supported Charles I. in his struggle with the Parliament. His forces were defeated at Fairfax, where he was taken prisoner, and was confined in the Tower for two years. His liberty was regained in 1646 by taking the covenant to support the Parliamentary party, and shortly after he served that party in Ireland. Later he took part with Cromwell in Scotland, where he was made major general and commissioned to conduct the war. All of Scotland was reduced to obedience in 1650. Three years later he coöperated with Admiral Dean in defeating the navy of Holland under command of Van Tromp. In 1654 he was made governor of Scotland, a position he held five years, and at the death of Cromwell he began a march to London, entering the city without opposition in the early part of 1660 with 600 men.

The Royalist party had looked upon Monk as a possible supporter, but he employed great cunning and deceit to avoid committing himself until it was reasonably certain that the Stuarts could be restored. By a policy of this kind it was possible to reorganize the Parliament by admitting excluded members and to limit the Parliamentary army. On May 23, 1660, he consummated his plan of the restoration by meeting Charles II. at Dover. The king promptly rewarded him with honors, created him Duke of Albemarle, and settled upon him a pension of $35,000 a year. During the plague in 1665 he demonstrated great ability as governor of London, but soon after retired entirely from public office. His death occurred from dropsy and the remains were buried in Westminster Abbey.

MONKEY, a name commonly applied to the whole order of quadrumanous mammals. However, the term is limited in its application by some writers to those having a well-developed tail and generally cheek pouches, but they exclude baboons, apes, and lemurs. The many species of monkeys are classified into two sections, the lower and the higher. The former are known as *New World Monkeys,* or *Platyrrhini.* They are native to the tropical regions of America. Ten species are native to the region north of the Isthmus of Panama, but none is found north of the Rio Grande. The animals of this division have tails, are devoid of cheek pouches, and live largely in trees. They feed principally on vegetable food. Among the species of this section are the *howling* monkeys, a class known from their peculiar noise at night; the *marmosets,* which are small and have peculiar, silky fur; and the *squirrel* monkeys, *spider* monkeys, *macaque* monkeys, *capuchin* monkeys, and a number of others.

The higher section embraces the *Old World monkeys,* or *Catarrhina,* and includes numerous species common to Africa, Asia, and many of the adjacent islands. The tail is either wanting or rudimentary, the nostrils are set obliquely, and the cheek pouches serve to store food before it is masticated. Among the representative species of this section are the *baboons, orangs, gorillas, proboscis monkeys, chimpanzees, anthropoid,* or *manlike apes, sacred monkeys* of the Hindus, *monas, Diana monkeys, mandrils, gibbons, wanderoos,* and many others. In general the Old World monkeys have a broad face, which distinguishes them from the New World species, and their tails, if any, are not used for climbing. All species have a more or less separated thumb and great toe, the former being more prominent than the latter. The name *quadrumana* is applied for that reason, meaning that they are four-handed. See illustration on following page.

MONMOUTH (mŏn′mŭth), a city in Illinois, county seat of Warren County, 180 miles southwest of Chicago. It is on the Minneapolis and St. Louis and the Chicago, Burlington and Quincy railroads. The buildings include the county courthouse, the high school, and Monmouth College, a United Presbyterian institution founded in 1856. It has systems of electric lighting, waterworks and sanitary sewerage. Among the manufactures are cigars, sewer pipe.

stoneware, machinery, flour, earthenware, and soap. It has a growing trade in farm produce and merchandise. Monmouth was settled in 1836 and incorporated in 1852. Population, 1900, 7,460; in 1920, 8,116.

MONMOUTH, Battle of, an important engagement of the Revolutionary War, fought on June 28, 1778, in Monmouth County, New Jersey. The British evacuated Philadelphia on June 18 for the purpose of concentrating at New York, and it was Washington's design to strike a severe blow upon their forces. He accordingly took a position at Allentown, N. J., and Gen. Charles Lee was dispatched with 6,000 men to make an aggressive attack, but he soon retreated without striking a blow. Washington at once severely rebuked Lee, restored order among the retreating troops, and a drawn battle resulted. The Americans lost 362 and the British lost 416 men, but Clinton made good his escape to New York. Lee was court-martialed for his conduct and was deprived of his command for a year.

APES AND MONKEYS.

A, Young Orang-Outang; *B*, Sacred Monkey; *C*, Cebur; *D*, Capuchin Monkey; *E*, Spider Monkey; *F*, Macaque Monkey; *G*, Squirrel Monkey; *H*, Howling Monkey.

MONMOUTH, James, Duke of, British soldier, born at Rotterdam, Holland, April 9, 1649; beheaded July 15, 1685. He was the son of Charles II. and his mistress, Lucy Waters, but some have doubted his paternity, although it was admitted by Charles. After Charles II. was restored, Monmouth became Duke of Orkney and of Monmouth, and wedded the rich heiress of the Earl of Buccleuch. He commanded in Scotland in 1679 and defeated the Covenanters at Bothwell Bridge. In 1683 it became known that he aided in instigating the Rye House Plot, in which Algernon Sidney and Lord William Russell lost their lives, and was accordingly exiled to Holland. He claimed the throne of England at the death of his father and landed in England on June 11, 1685. With a force of 3,000 undisciplined peasants and miners he risked a battle with the forces of James II., but was defeated at Sedgmoor and captured. His apparent repentance and promise to embrace the Catholic religion did not save him from execution nor move the king to mercy.

MONOMANIA (mŏn-ō-mā′nĭ-ȧ), a form of insanity, consisting of a delusion without impairing the intellect of the afflicted. A person subject to this form of insanity may be rational in all respects, except that he is insane on one topic or in some particular direction. Monomania includes several distinct varieties, such as *kleptomania*, an irresistible propensity to steal, and *dipsomania*, an uncontrollable craving for drink, especially alcoholic liquors.

MONOMETALLISM (mŏn-ō-mĕt′ȧl-ĭz′m), the financial theory of a single metallic standard in the coinage of money. See **Bimetallism.**

MONONGAHELA (mō-nŏn-gȧ-hē′lȧ), a river of the United States, having its source in Upshur County, West Virginia. It has a general course toward the northeast to the Pennsylvania line, thence flows northward to Pittsburg, where it joins the Allegheny to form the Ohio. It is a rapid stream, supplying an abundance

of water power, has a length of 150 miles, and is navigable for river boats a distance of 50 miles.

MONONGAHELA, a city of Pennsylvania, in Washington County, on the Monongahela River, thirty miles south of Pittsburg. It is on the Pennsylvania Railway and is surrounded by a farming and a coal mining country. The manufactures include paper, flour, glass, machinery, and clothing. It has a number of fine public schools and churches, electric lighting, waterworks, and sewerage. The first settlement on its site was made in 1772 and it was incorporated in 1873. Population, 1920, 8,688.

MONOPOLY (mŏ-nŏp′ŏ-lȳ), a term applied in economics to the exclusive power of sale, production, transportation, or purchase of any commodity. Monopolies have been a factor in commerce from remote history. They were maintained at various times by monarchs to enhance their own profit, to enrich chiefs or favorites, and to raise supplies for the maintenance of government. Monopolies were abundant especially during the Middle Ages, practically all of the trade privileges and production of necessary commodities being in the hands of individuals or associations for personal or corporate gain.

It is no doubt true that monopolies are generally an evil, since they give special advantages to the classes who are most able to battle for an economic existence, and, on the other hand, they may work a hardship upon the industrial and laboring classes. However, there are instances in history where monopolies have been the means of effecting permanent good, such as those resulting from patents to land in the early development of the American continent. These patents gave certain individuals control of trade with the lands to be discovered or settled, thus making it possible to secure enormous reward for enterprises whose risks would otherwise have prevented their being undertaken. The East India Company, chartered in England in the reign of Queen Elizabeth, is a notable example of a vast monopoly. It was at first beneficial in developing enterprises, but later became greatly opposed by the people, owing to its depressive influence upon men of small means, particularly because it affected those who sought to found new and infant industries.

In general, the monopolist has absolute control over the prices of his services or commodities. By controlling the supply, he is able to create an artificial scarcity, thus making it more difficult to attain the necessary commodities to support life, and a rise in price to the limit of the consumers' ability to purchase is the result. Any one beginning business with small means may be ruined in his enterprise by the monopolist selling his products below cost of production, but, after the small trader or manufacturer has become bankrupt, the prices may again be raised to an exorbitant rate. Among the monopolies are those known as landed, by which corporations have come into possession of the principal fields containing valuable deposits of natural gas, petroleum, anthracite and bituminous coal, and forests. Transportation monopolies affect the market by controlling largely the transportation facilities. The so-called *legal monopolies* include those especially reserved by the government or granted by patents, or charters, to individuals and corporations. There has been a tendency for some decades to promote enterprises of a monopolistic character in all lines of production whereby the producers, traders, or manufacturers can secure special advantages of some kind and to some extent. In several political campaigns the question of monopolies or trusts has been an important factor, but the solution still awaits at least to a large extent the earnest application of true principles of statesmanship.

The post office system is a government monopoly, but it is the most wholesome and beneficial institution supported by the whole people for the benefit of all classes. The events of the past two decades indicate a strong drift toward other systems coming under like control, such as the telegraphs, telephones, public lighting, street railways, and even railroads. Germany and France control exclusively the tobacco trade, this commodity being produced or imported and sold by government agents to yield public revenue. Railroads, electric car lines, and telegraphs are managed quite generally in the same way by Russia, Germany, Austria, and other countries of Europe. The governments of Canada and the United States grant a monopoly for a period of seventeen years to an inventor under a patent. Copyrights are issued for a period of 28 years and they may be renewed for fourteen years, if certain conditions are complied with. Both patents and copyrights have been the means of inducing men of genius to devote many years of careful study to the invention and publication of products of much value.

MONOTHEISM (mŏn′ō-thē-ĭz′m), the doctrine or belief that there is but one God, being opposed to *polytheism,* which is the doctrine that there are many gods. Formerly it was thought that monotheism constitutes the original religion, but it is generally held at present that polytheism preceded it, the former being adopted through the education and enlightenment of mankind. Christianity, Judaism, and Mohammedanism are the three principal monotheistic religions of modern times.

MONOTREMATA (mŏn-ō-trĕm′ă-tă), an order of mammals that have only one aperture for the genital, urinal, and intestinal canals. The mammary glands are well developed, but have no nipples, and the teeth, if present at all, are formed of four horny plates. Darwin traced a certain connection between the higher mammals and reptiles through the monotremata, and showed their approach to birds. The *duck-*

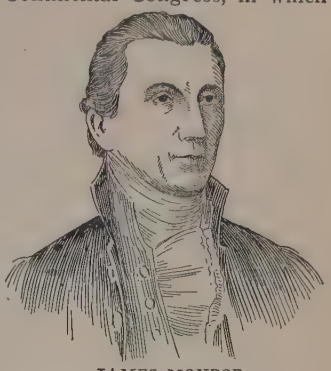
bill and *echidna* of Australia are representative species of this order.

MONOTYPE (mŏn'ō-tīp), a machine to cast and set type singly, instead of in a line, as is done by the linotype. It consists of two parts, the perforating apparatus and the type-casting and setting machine. As the operator uses the keyboard, which resembles that of a typewriter, the keys perforate a narrow strip of type paper, which is afterward adjusted to guide the machine in casting the type. The type cast in this machine is single, resembling that used in hand composition, and is afterward arranged in lines and columns as required in the form to be set. While the operation is not as rapid as that of the linotype, it is preferable for high-class work, such as book printing, since various sorts of type can be produced and the printing is more uniform than can be obtained from composition in which the letters or words are cast in a solid line.

MONROE (mŭn-rō'), a city in Louisiana, capital of Ouachita Parish, on the Ouachita River, in the north-central part of the State. It is on the Queen and Crescent, the Illinois Central, and the Missouri Pacific railroads. The river is navigable for steamboats. The chief buildings include the courthouse, the high school, and the Federal building. Among the manufactures are lumber, brick, cigars, machinery, furniture, and cotton-seed oil. It has a considerable trade in cotton and merchandise. Population, 1900, 5,428; in 1920, 12,675.

MONROE, a city and the county seat of Monroe County, Michigan, at the mouth of the Raisin River, 35 miles southwest of Detroit. It is about two miles from Lake Erie, on the Père Marquette, the Michigan Central, and the New York Central railroads, and is surrounded by a productive farming and fruit-growing country. The principal buildings include the public library, the county courthouse, the armory, the opera house, and the Saint Mary's Academy. Among the manufactures are dairy products, tile, flour, lumber products, furniture, and machinery. A company of Canadians settled here in 1784, when it was called Frenchtown, and it was platted as Monroe in 1815. It was incorporated in 1836. Population, 1904, 6,128; in 1920, 11,573.

MONROE, James, fifth President of the United States, born in Westmoreland County, Virginia, April 28, 1758; died in New York City, July 4, 1831. He was the son of Spence Monroe and Elizabeth Jones, natives of Virginia, and received an education at William and Mary College. In 1777 he enlisted as a private soldier in the Revolutionary army. He took part in several battles, was wounded at Trenton, and for distinguished service became lieutenant colonel. In 1777 and 1778 he distinguished himself as aid to Lord Stirling, studied law under the direction of Thomas Jefferson, then Governor of Virginia, and in 1780 served on an important commission to the army in South Carolina. He was chosen a member of the Virginia Assembly in 1782 and the next year became a delegate to the Continental Congress, in which he served until 1786. While a member he married a Miss Kortright of New York City, and, after retiring from Congress, entered upon the practice of law at Fredericksburg, Va. Shortly after he became a member of the Legislature, and in 1788 was selected a delegate to the State convention that assembled to consider the Federal Constitution.



JAMES MONROE.

The efforts of Monroe were in unison with those of Patrick Henry and other Anti-Federalists, who held to the doctrine that large powers should be vested in the people. From 1790 to 1794 he served as a member of the United States Senate, but in the latter year was appointed by Washington as minister to France. His free expression of opinions on the political issues in France, in view of the strained relations between that country and the United States, caused Washington to recall him in 1796, when he was again elected to the Legislature, and from 1799 to 1802 served as Governor of Virginia. His political views were in accord with those of Jefferson and the Democratic party, and he was accordingly selected as envoy extraordinary to France in 1802, and in 1803 became the successor of Rufus King as minister to London, where he remained until 1807. While in France he served with Livingston and Robert Morris in effecting the Louisiana Purchase in 1803, and in 1805 undertook to negotiate the purchase of Florida from Spain, but in this he failed. He was again elected Governor of Virginia in 1811, but in the same year was selected by President Madison as Secretary of State, serving until 1817.

In 1816 Monroe was elected President of the United States as a Democrat, receiving 183 electoral votes, while Rufus King received 34 as the candidate of the Federalists. His administration was so eminently successful that it became known as "The era of good feeling," and in the election of 1820 he received 231 electoral votes out of a total of 235. Monroe surrounded himself by the most eminent statesmen of his time and demonstrated much ability in dealing with public questions. Among the events of his administration are the purchase of Florida from Spain in 1819, the Missouri Compromise regarding slavery, the Seminole War, the visit of Lafayette, the recognition of the independence of

the South American republics, and the establishment of the Monroe Doctrine. After retiring from the Presidency, he took up his residence in Loudon County, Virginia, served as president of the convention called to revise the State constitution, and later made his home with his son-in-law, Samuel L. Gouverneur, in New York City.

MONROE DOCTRINE, a policy announced by President Monroe in a message to Congress in 1823. It commits the United States to the doctrine that any interference of European powers in the political affairs of North and South America is an unfriendly act to the countries of the New World. After 1815, following the overthrow of Napoleon, an alliance was formed by Russia, Germany, Austria, and France for the purpose of preserving the balance of power and suppressing revolutions within their dominions. Mexico and the states of South America revolted against Spanish occupation, and in 1822 the independence of these countries was recognized by the United States. It was suspected that the allied powers would come to the rescue of Spain, on account of which Monroe declared in a message to Congress on Dec. 2, 1823, "that the American continents are henceforth not to be considered as subject to colonization for any European power. With the existing colonies or dependencies of any European power we have not interfered and shall not interfere, but with the governments which have declared their independence and maintained it, and whose independence we have acknowledged, we could not view any interposition for the purpose of suppressing them, or controlling in any other manner their destiny, by any European power, in any other light than as the manifestation of an unfriendly disposition toward the United States."

The doctrine announced by Monroe has been maintained on many subsequent occasions, particularly in relation to the Isthmus of Panama, the French intervention in Mexico under Maximilian, and the dispute of Great Britain and Venezuela regarding the boundary between the latter and British Guiana. The Spanish-American War likewise involved an important feature of the doctrine, namely, that a country having possessions in America is bound to exercise reasonable intelligence and a humane policy in dealing with the people and their civil institutions. More recently the policy has been extended to imply that the United States is responsible to a certain extent for the smaller republics of America, especially for the international relations of the governments of Cuba and Central America.

MONROVIA (mŏn-rō′vĭ-ȧ), a seaport of West Africa, capital of Liberia, on the Saint Paul River, so named in honor of President Monroe. The climate is unhealthful, but the place has a large trade in rubber, dyewoods, and palm oil. It has several government buildings, a hospital, and a public library. Higher education centers largely in the university maintained by the Methodists. Steamships belonging to the principal European lines visit the harbor regularly. Communication inland is by a motor road and by river navigation. The place was founded in 1824. Population, 1922, 8,554.

MONS (môns), a city of Belgium, capital of the province of Hainaut, on the Trouille River, 35 miles southwest of Brussels. It is connected by several railroads and is surrounded by a farming and coal-mining country. Among the principal buildings are the Cathedral of Saint Waltrudis, the public library, the townhall, the palace of justice, and the Hôtel de Ville. The manufactures include cotton and woolen goods, sugar, spirituous liquors, cutlery, soap, and machinery. The site was occupied by a Roman fort. In 804 it was made the capital of Hainaut by Charlemagne, after which it was strongly fortified, and for some time was in several contests between Austria and France. Population, 1922, 27,046.

MONSOON (mŏn-sōōn′), a term applied in general to winds blowing half the year in one direction and half in the other, such as occur regularly in certain sections of North America, North Africa, Australia, and South Africa. They are caused by the unequal heating of the land and water, as well as of the several large land masses in the regions in which they affect the continents. They are of utility in navigation in that navigators plan their voyages to take advantage of the movements of air, thus rendering it less expensive to make rapid voyages. Monsoons are the means of bringing rain to countries which would otherwise lapse into deserts. The term is applied particularly to the modification of the regular trade winds that are common to the Indian Ocean, the Bay of Bengal, and the western Pacific. These monsoons are of two classes, the *southwestern,* prevailing from April to October, and the *northeastern,* prevailing from October to April.

MONTAGU (mŏn′tȧ-gū), **Lady Mary Wortley,** famous letter writer, born in Thoresby, England, in 1690; died Aug. 21, 1762. She was the eldest daughter of Evelyn Pierrepont, was introduced by her father to the Kit-Cat Club at the age of eight years, and received a classical education. In 1712 she married Wortley Montagu, a personal friend of Queen Anne, and thus came in contact with the court society of London. Her ready wit and great beauty made her distinguished at the court of George I. Among her personal friends were such men of literature as Pope and Addison. Her husband was appointed ambassador to Constantinople in 1716, where the two remained until 1718. During that time Lady Montagu became famous for her "Turkish Letters," productions which are characteristic for the independent judgment of the writer as well as for her keen observation and splendid descriptive power.

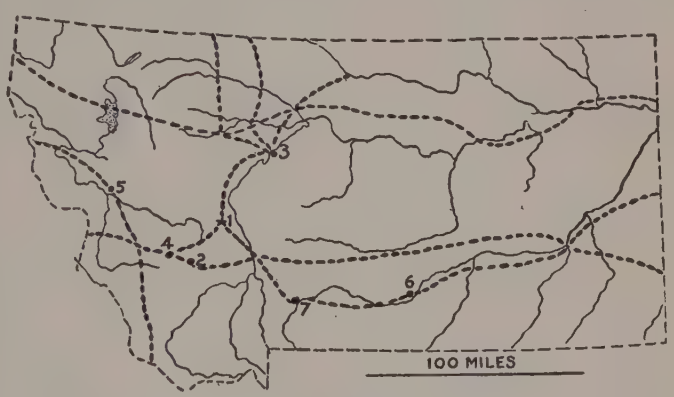
While in Turkey she became favorably impressed with the practice of inoculation for smallpox, which she first tried on her own son, and afterward encouraged it in England. A complete edition of her writings, entitled "Letters and Works," was published in 1837.

MONTAGUE (mŏn'tȧ-gū), a town of Massachusetts, in Franklin County, on the Connecticut River. It is on the Fitchburg and the Vermont Central railroads. The chief buildings include the public library and several public schools. It has manufactures of paper, hardware, brick, and cotton goods. The public utilities include waterworks, sanitary sewerage, and electric lighting. Turner Falls and several villages are included with it, and on the opposite side of the Connecticut River is Greenfield. The first settlement was made in 1716 and it was incorporated in 1753. Population, 1900, 6,150; in 1925, 7,973.

MONTAIGNE (mŏn-tān'), **Michel Eyquem de,** author and moral philosopher, born in Périgord, France, Feb. 28, 1533; died Sept. 13, 1592. He was trained from early infancy under a system which met the approval of his father. For the purpose of forming habits of industry and acquiring sympathy for the poor, he was nursed in a common village home, where he was taught no language but Latin, and which constituted his only means of conversation until he was six years of age. At that time he was sent to a school and in his tenth year entered the College of Bordeaux. Subsequently he took a course in law and in 1554 became councilor in the parliament of Bordeaux, in which position he served thirteen years. He retired from public service in 1571 for the purpose of engaging in literary work, his first production being a translation of "Natural History," a Spanish work. The death of his brothers gave him sole possession of his ancestral estate, where he devoted himself to writing his famous "Essays." These writings treat of various topics in relation to morality, industry, daily associations, and many kindred subjects, and include several that grew rapidly in favor and are still widely read. These writings are popular because the author invented a literary form of great perfection, which he applied with marked efficiency in treating the various topics of interest. Several of the essays have been translated into many languages and are as widely read as some of the productions of Schiller and Shakespeare.

MONTANA (mŏn-tă'nȧ), a northwestern state of the United States, separated from British America by the international boundary, 49° north latitude, popularly called the *Treasury State.* It is bounded on the north by Alberta and Saskatchewan, east by North Dakota and South Dakota, south by Wyoming and Idaho, and west by Idaho. In size it ranks third among the states of the Union, being exceeded only by California and Texas. The greatest length from east to west is 540 miles; the average width from north to south, 275 miles; and area, 146,080 square miles, including a water surface of 770 square miles.

DESCRIPTION. The eastern portion comprises an elevated plain, the altitude being from 1,750 feet in the northeast to 4,000 feet among the foothills of the Rocky Mountains, which trend through the western part. The Continental Divide, which crosses the State from the southwestern boundary, extending in a northwesterly direction, is the main range of mountains. It is separated by a wide basin from the Bitter Root Range, which forms the western boundary, and whose summits extend from 7,500 to 8,000 feet above sea level. Mount Douglas, the highest elevation in the State, is one of several peaks that rise from 9,500 to 11,300 feet. In general these mountains are considerably lower and less rugged in Montana than farther south in Wyoming and Colorado. They are characterized by many fertile valleys and outlying ranges of hills. The eastern part of the State has numerous buttes and spurs of mountains, including the Powder River Range in the southeast,



MONTANA.

1, Helena; 2, Butte; 3, Great Falls; 4, Anaconda; 5, Missoula; 6, Billings; 7, Livingston. Chief railroads shown by dotted lines.

the Piny Buttes in the east central part, and Bear's Paw Mountains in the north. Fine forests of spruce, tamarack, pine, fir, cedar, and hard wood are found in the mountains and along many of the streams.

The Continental Divide forms the principal watershed, separating the basin of the Columbia from that of the Missouri, all of the drainage being by these two river systems. However, the larger part of the State is drained by the Missouri, which rises by several headstreams in the southwestern part and flows northeast beyond Fort Benton, after which it has a general

course eastward. On the southern boundary is Yellowstone National Park, from which the Yellowstone enters Montana and flows through a large portion of the Bad Lands, which extend into the State from Wyoming. The Musselshell and the Yellowstone are the principal tributaries of the Missouri from the south, and the Yellowstone receives the inflow from the Powder, Big Horn, and Tongue rivers. The streams flowing into the Missouri from the north include the Poplar, Milk, Marias, Teton, and Sun rivers. Among the streams belonging to the Columbia system are the Kootenai and Clark rivers, which leave the State before joining the Columbia. The Missoula and the Flathead, both tributaries of the Clark, drain the lake basin in the northwestern part, which includes Lake Flathead, the only large body of water in the State.

The climate is dry and healthful and the atmosphere is clear a large portion of the time. Being an inland State, it has a wide range of temperature, rising in summer to 95° or even 100°, and falling in January as low as 45° below zero. The mean temperature of the State is given as 46°, but for the coldest months it is 11° and for the warmest, 70°. In winter the extreme cold is tempered by the warm and dry Chinook winds, which blow from the west and absorb much of the moisture. Large areas of the State have insufficient rainfall to support agriculture without irrigation, which is employed to a considerable extent. The precipitation ranges from 12 to 20 inches per annum, being somewhat larger in the western than in the eastern part.

Mining. Montana is rich in many of the useful minerals and mining still holds rank as the leading industry. In the output of copper it has high rank, the annual production averaging about $40,750,000. Butte and Anaconda are the principal centers of copper mining. In the production of silver it stands second, but is a close rival to Colorado, the annual output having a commercial value of $10,500,000. The output of gold has about a fifth the value of its silver, but both gold and silver are obtained from the same mines as copper. A fine grade of bituminous coal is mined in several sections of the State and the output has been increasing annually. Granite and limestone are abundant and furnish a superior quality of building materials. Other minerals include lignite coal, sapphire, lead, and commercial clays.

Agriculture. Farming and gardening are carried on most successfully in the region lying immediately west of the main range of the Rocky Mountains, where the rainfall is sufficient to mature the crops. In the eastern part the rainfall is scant, hence irrigation is depended on more or less. About half of the cultivated fields are irrigated and the irrigated area is being extended constantly under private ownership and by the reclamation service of the Federal government. Wheat is grown on the largest scale, exceeding in extent that of hay, which is given as second in acreage. Other crops grown extensively include corn, flax, barley, and potatoes. Rye, though raised to some extent, is not an important crop. Sugar beets and garden vegetables are grown profitably. Small fruits and apples thrive in many parts of the State.

Large areas of the plains have nutritious grasses, including both buffalo and bunch grass, hence stock raising is a source of large returns. The buffalo grass cures on the root in the fall and furnishes good grazing during a large part of the winter. In the number of sheep Montana holds second rank, and they are reared both for wool and mutton. Formerly they were shipped east to be fed for the market, but the cultivation of alfalfa on a large scale has made it possible to fatten them before shipping. The output of wool is placed at 20,500,000 pounds per year. Cattle are grown principally for beef, though dairying is receiving larger attention from time to time. The cattle industry is carried on quite generally as an exclusive enterprise, though the herds are more numerous and somewhat smaller than formerly. Other live stock includes horses, swine, mules, and poultry.

Manufactures. The manufacturing enterprises have a large output, but they are represented chiefly by the refining and smelting industries. Some of the largest copper smelters in the world are located within the State, which has an abundance of water power at many points on the Missouri and other rivers, making manufacturing enterprises profitable. Bonner and Hamilton have large interests in lumbering. Flour and grist mills are operated by steam and water power in several points of the State. Coke is manufactured for use in the smelters. Montana is noted for its production of fine wheat, owing to its dry climate during the harvesting season, and on account of this circumstance has built up many flouring mills. Other manufactures include clothing, ironware, pottery, brick, cigars, and machinery. Anaconda, Great Falls, Butte, and Helena have the largest manufacturing establishments.

Government. The constitution in force at present was adopted in 1889 and is the only one the State has had since its admission. The chief executive officers are the governor, lieutenant governor, secretary of State, attorney-general, auditor, treasurer, and superintendent of public instruction, all of whom are elected for terms of four years. The Legislature consists of a senate and a house of representatives, the former having 27 members elected for four years and the latter 73 members elected for two years. Meetings of the Legislature are held every two years, limited to sixty days. Three justices, elected for six years, constitute the supreme court. The State is divided into judicial

districts, each of which has one or more judges elected for four years. County and township officers are elected for two years.

Transportation. Three of the great transcontinental railways cross the State, including the Northern Pacific, the Great Northern, and the Chicago, Milwaukee and Saint Paul. Other lines enter the State from the south and southeast, and all have branches from the principal trade centers to points within the State, hence the facilities for communication are extensive. At present the lines equal a total of 5,850 miles. In the mountains conveyance is largely by saddle horses, pack mules, and automobiles. None of the rivers is navigable for large boats, but considerable rafting is done. Many of the highways have been improved by grading and the construction of bridges.

Education. Ample facilities were made for education through the government reservation of public lands, the income of which is distributed among the schools. Additional support is obtained through a system of State and local taxation. The schools are under the supervision of a State superintendent, who is assisted by county and city superintendents. A law requiring uniformity of text-books throughout the State and attendance at school between the ages of eight and fourteen years was passed in 1903. This law has had a wholesome effect in bringing all the children in contact with educational work. County high schools are maintained in most of the counties and in all of the larger towns and cities. The average length of the school term for the State is 7.6 months, but in the towns it is nine months. A revised and enlarged course of study was adopted for general use in 1922. The rate of illiteracy is reported at 2.3 per cent.

The University of Montana, located at Missoula, is at the head of the State system. Dillon is the seat of the State normal school, which has ample facilities for training teachers. Butte has a school of mines and Bozeman has a college of agriculture. Many parochial schools and private institutions of higher learning are maintained. The State reformatory is at Miles City, the penitentiary is at Deer Lodge, and the school for the deaf and blind is at Boulder. Twin Bridges has a State orphans' home and Columbia Falls has a soldiers' home. Warm Springs is the seat of a hospital.

Inhabitants. The western part of the State contains the larger number of inhabitants, owing to that section having the larger mining interests. A large per cent. of the people are of foreign birth, but no nationality is represented by large numbers, though nearly all are of European birth. The inhabitants are principally immigrants from states farther east and their descendants. Helena, in the west central part of the State, is the capital. Other cities of importance include Butte, Great Falls, Anaconda, Bozeman, Livingston, Missoula, and Kalispell. In 1900 the total population was 243,329, which included 1,523 Negroes and 11,343 Indians. Population, 1920, 547,593.

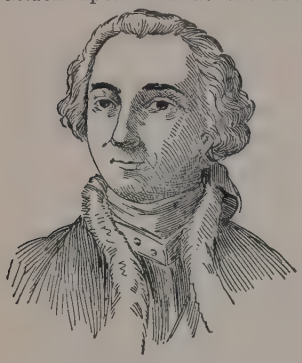
History. Montana was formed partly of the Louisiana Purchase and partly of a region formerly included with Washington and Oregon, the former lying east of the Rocky Mountains. The region was first explored in 1742 by the French, and soon after Jesuit missionaries began to operate among the Indians. An abundance of wild game and many fur-bearing animals made it a favorable region for trappers and fur traders at an early date. Gold was discovered in 1861, which soon caused many immigrants to make settlements in the western portion. The Territory of Montana was formed in 1864 and its admission into the Union was effected in 1889. Railroad building and the construction of irrigation canals soon caused many agriculturists and stock raisers to settle upon the public lands, and since then its development has been steady and rapid.

MONTANA, University of, a coeducational State institution of Montana, founded at Missoula in 1895. The departments include those of science, literature, arts, and philosophy, and it offers in addition preparatory and graduate courses. Affiliated with it are a summer school and a biological station. All residents of the State are admitted free of tuition. The library has 120,000 volumes and the university property is valued at $2,500,000. Congress endowed the institution by a grant of 72 sections, or 46,080 acres, of land under an act passed in 1892. The faculty consists of eighty-five professors and instructors and the attendance averages 1,750 students.

MONT BLANC (môn blän'), meaning White Mountain, a celebrated mountain situated on the boundary between Italy and France, near the frontier of Switzerland. It is a peak of the Alps, the loftiest of Europe, rising to an altitude of 15,787 feet. This vast mountain is about thirty miles long and ten miles wide. It has many summits and is formed largely of granite. In 1786 the highest peak was reached under the direction of Jacques Balmat, this being the first entire ascent. Among the thirty glaciers that have their source in Mont Blanc are Mer de Glace, Bois, and Des Bossons.

MONTCALM (mŏnt-käm'), **Louis Joseph, Marquis de,** colonial soldier, born near Nimes, France, Feb. 28, 1712; died Sept. 14, 1759. He secured a careful education, entered the army at the age of fifteen, and served successively in Italy, Bohemia, and Germany. In 1743 he was promoted colonel and in 1755 succeeded General Dieskau in Canada as commander in chief. The following year he landed in America. Soon after he captured Oswego. In 1757 he occupied Fort William Henry and the next year took possession of Ticonderoga. At that place he was attacked by General Abercrombie with 15,000 men in 1758, but Montcalm repulsed his force by skillful strategy. In 1759 General

Wolfe ascended the Saint Lawrence to engage Montcalm in battle and on Sept. 13 made an attack upon him at the Heights of Abraham, near Quebec. About 5,000 men were engaged on each side and both Wolfe and Montcalm were mortally wounded. Wolfe died the same day and Montcalm expired the following morning. As a result of the battle the French lost all of Canada.



LOUIS JOSEPH MONTCALM.

MONTCLAIR (mŏnt-clâr'), a town of New Jersey, in Essex County, five miles northwest of Newark, on the Erie and the Lackawanna railroads. It is nicely situated on the slope of the very interesting Orange Mountains, at an elevation of about 500 feet, and is the residence of many New York business men. Electric lights, pavements, waterworks, and electric street railways are among the improvements. The chief buildings include the public library, the high school, the Montclair Military Academy, and two orphan asylums. It is a center of many fine homes and clubs, and has a large trade in merchandise, fruits, and cereals. The place was incorporated in 1868. Population, 1905, 16,370; in 1920, 28,810.

MONTE CARLO (mŏn'tā kär'lō), a small town in Monaco, near the Mediterranean. It is noted as a popular resort for health seekers and gamblers. The gambling institutions are authorized by the Prince of Monaco for the purpose of securing revenue to defray the expenses of government. The place has many fine hotels and much business activity in connection with the entertainment of tourists. It is estimated that the average number of visitors annually approximates 400,000. Population, 1921, 9,794.

MONTEFIORE (mŏn-tē-fē-ō'rē), **Sir Moses,** philanthropist, born at Leghorn, Italy, Oct. 24, 1784; died at Ramsgate, England, July 28, 1885. He was born of Jewish parents, whom he accompanied to London in childhood, and, after receiving a fair education, entered upon a successful and brilliant career as a banker. In 1837 he became sheriff of London, was admitted to knighthood the same year, and in 1846 was made a baronet. After 1854 he devoted his time almost entirely to benevolent work in endeavoring to improve the condition of the Jewish people. For this purpose he made visits to Russia, Austria, Rumania, and Palestine, and not only petitioned the Czar of Russia and other sovereigns for the proper treatment of the Jewish people, but spent vast sums of money to bring about educational and political reforms. In 1835 he devoted $75,000,000 for the purpose of compensating slave owners in British possessions for liberating their slaves. He founded the Judith Montefiore College at Ramsgate in memory of his wife, an institution adequately equipped for the training of Jewish divines. Distinguished honors were accorded him by sovereigns of all civilized countries, and at the age of 100 years he was still hale and active

MONTENEGRO (mŏn-tā-nā'grō), meaning Black Mountain, a region of Europe, in the western part of Jugo-Slavia. The boundaries are formed by Albania, Novibazar, Herzegovina, Dalmatia, and the Adriatic Sea. The area is 5,630 square miles. Much of the surface is mountainous, being traversed by the Dinaric Alps, the highest peaks attaining an elevation of 8,825 feet. The drainage is chiefly by the Zeta and the Moraca rivers, which flow through fertile valleys. Lake Scutari, on the border of Albania, receives the inflow of both these streams. The soil is highly productive along the coast and in the valleys. Among the principal products are corn, rye, barley, potatoes, cheese, honey, butter, and fruits. Cattle, sheep, goats, and horses are reared in the grazing lands of the mountains. The mountain slopes furnish a supply of valuable timber, including many hardy species. Extensive stone quarries and fisheries furnish employment for a large number. Among the manufactures are cotton and woolen goods, clothing, earthenware, butter and cheese, canned and cured fish, tobacco, wine, and machinery.

The inhabitants are mostly Montenegrins, belonging to the Slavic race, but include some Serbs and Albanians. They belong almost entirely to the Greek Catholic Church. The government supports a general system of education, the schools being free to all. Attendance at school is nominally compulsory. The commercial trade is developing steadily under government stimulation. It is a constitutional monarchy and the reigning prince is politically friendly to the imperial house of Russia. Executive authority is vested in the sovereign, Nicholas I. (born Oct. 7, 1841), who has large freedom in the discharge of his duties, and the legislative power is exercised by a council of state. The language and literature are Servian.

Montenegro belonged to Servia in the Middle Ages, but, when the latter was conquered by the Turks in 1389, the Montenegrins fortified themselves in the mountains. There they offered stubborn resistance to Turkish attacks until 1714, when they were subjugated, but soon after again became independent under the protection of Russia. Pietro I. was recognized as a bishop-prince in 1796 and defeated the Turks under the Pasha of Scutari, and for a quarter of a century maintained peace. He was succeeded by Pietro II. in 1830, who in his reign of 21 years was successful in establishing schools and

effecting internal improvements. At the death of that sovereign the church and state became separated, but the reforms in the civil service did not meet the approval of Russia, and the Turks took advantage of this condition by invading the country. The great powers compelled the conclusion of a treaty in 1853, but the sovereignty of Turkey was formally recognized in 1862. In the war of Russia against Turkey, in 1877-78, the Montenegrins coöperated with the former, thus securing their independence at the close of the contest. The country took an effective part in the Balkan War of 1913. Cetinje, the capital, has a population of 4,542. King Nicholas I. abdicated in 1918 and the region was made a part of Jugo-Slavia. Population in 1922, 516,250.

MONTEREY (mŏn-tĕ-rā'), a city of Mexico, capital of the state of Nuevo León, 160 miles west of Matamoras. It is an important railroad center, is surrounded by a fertile agricultural country, and has an extensive jobbing trade. The manufactures include cotton and woolen goods, tobacco products, clothing, machinery, jewelry, and utensils. Among the principal buildings are the cathedral, the state capitol, the public library, and a theological seminary. The place was founded by the Spaniards in 1581. It was captured by the American forces under General Scott in 1846. Population, 1907, 78,788; in 1920, 81,006.

MONTEREY, Battle of, an engagement of the Mexican War, fought on Sept. 21, 1846. General Taylor, with a force of 6,700 men, moved from Matamoras against Monterey, which was occupied by 10,000 Mexicans under General Ampudia. A detachment of Americans under General Worth occupied the heights west of the city, but the battle continued for three days, and on the 24th terms of capitulation were agreed upon, under which the city was surrendered, but the Mexicans were permitted to withdraw and retain their small arms and some ammunition. Much dissatisfaction was caused in the United States by the terms of capitulation.

MONTESQUIEU (mŏn-tĕs-kū'), **Charles de Secondat, Baron de,** author and philosopher, born near Bordeaux, France, Jan. 18, 1689; died in Paris, Feb. 10, 1755. He descended from a distinguished family of Guienne and secured a careful training in literature, philosophy, and jurisprudence. In 1714 he became councilor of the Bordeaux parliament and two years later was made its president. He possessed a natural love for science, but selected literature as a special pursuit. In 1721 he published one of the great works that made him famous, entitled "Parisian Letters." This production is designed to represent the views of two distinguished visitors at Paris and is a satire on the society and practices of the French. Shortly after he spent a number of years traveling in foreign countries to study the institutions and political life of his time, and in 1728 was admitted to the French Academy. His great work, entitled "The Spirit of Laws," embodies the research and labor of twenty years. The third of the three celebrated works upon which his reputation is based chiefly is a publication that appeared in 1734, entitled "Thought Upon the Causes of the Greatness of the Romans, and Their Decay."

MONTESSORI METHOD, a system of primary education introduced at Rome, Italy, by Maria Montessori about 1898. It differs from the kindergarten method mainly in that it aims at the individual development rather than the collective plan of teaching. The teacher is a directress rather than an instructor and the aim is to observe and guide rather than to teach. Much has been said of this system by Canadian and American educators and in general they regard it less adaptable to our schools than the systems of Froebel and Pestalozzi, as these systems have been modified by recent experience.

MONTEVERDE (mŏn-tā-vĕr'dā), **Claudio,** composer, born at Cremona, Italy, in 1567; died in 1643. He is classed among the earliest composers of Italy, and is celebrated especially for his gifts in the composition of dramatic music. Besides producing many operas, he did much to reform instrumentation, of which he is sometimes called the originator. Only a limited number of his productions are extant.

MONTEVIDEO (mŏn-tĕ-vĭd'ē-ō), a city of South America, capital of Uruguay, on the north shore of the estuary of the La Plata, 108 miles east of Buenos Ayres. The site is on a small peninsula. It has a fine climate and an excellent and well-sheltered harbor. It is a railroad center. The streets are platted to cross each other at right angles. They are improved by many modern facilities and as a whole the city is one of the best built and most modern in South America. Originally the harbor had an average depth of seventeen feet, but extensive improvements have been made by excavations and the construction of dry docks and wharves. The export and import trade is very important, since its location is at the most convenient point for river navigation on the Uruguay and Paraná rivers. Among the manufactures are cotton and woolen goods, machinery, hardware, utensils, furniture, lumber products, and clothing. Steamboat communication is maintained with all the leading countries of the world.

Montevideo is generally well built of brick and stone. The chief buildings include the national capitol, the Church of the Immaculate Conception, the university, the customhouse, the post office, the public library, the national museum, a normal school, and the central railway station. It has systems of waterworks, sanitary sewerage, gas and electric lighting, and electric street railways. The inhabitants include a large number of French, Spanish, and Italians. Fully one-third of the people are of

these three races. Montevideo was founded in 1717. It was made the capital of Uruguay in 1828. Population, 1922, 394,645.

MONTEZUMA (mŏn-tē-zōō'mà), the name of two emperors of Mexico. Montezuma I. ascended the throne about 1437 and soon enlarged his dominion by defeating the King of Chalco and annexing his territory. He is regarded the most able Mexican emperor, since he demonstrated much ability in adding consecutive annexations and in making the possessions of the Montezumas the most extensive in the region that now comprises Mexico. His death occurred in 1471. Montezuma II. was the last Aztec emperor of Mexico. He succeeded to the throne in 1502 and became noted for his interest in encouraging architecture and industrial arts. It was during his reign that the famous palaces of Mexico were constructed. Within his time the Mexican frontier was pushed forward to include all the territory as far south as Honduras and Nicaragua. His court was one of much wealth and magnificence. In his reign the capital was improved by the building of aqueducts and thoroughfares. When the Spanish under Cortez landed on Mexican soil, in 1518, he recognized that they were superior in military skill and offered to make peace with them by turning over his treasures. After he had been imprisoned by the Spaniards, repeated indignities were heaped upon him, and his death resulted from a wound received accidentally on June 30, 1520. Charles V. made his eldest son Count of Montezuma. Some of his descendants adopted the Christian religion and a number held high official positions, particularly Don Marsilio de Teruel. However, he was afterward banished from Spain and later from Mexico on account of his liberal political views.

MONTFORT (mŏnt'fĕrt), **Simon de**, Earl of Leicester, noted character in early English history, born in France in the early part of the 13th century; slain in battle, Aug. 4, 1265. He descended from a noble French family, but in 1230 came to England, where he entered the service of Henry III. On Jan. 7, 1238, he privately married the sister of the king, widow of the Earl of Pembroke. This marriage contract caused opposition among the barons and implicated the court in a controversy for the reason that Eleanor, the newly wedded wife, had taken the vow to be a nun. However, Montfort obtained the papal sanction to the marriage and in 1240 went on a crusade to the Holy Land. In 1258 the barons and others moved to banish the foreigners from the court of Henry III., partly because of jealousy, but chiefly on account of a famine that had been occasioned by poor crops. This movement was headed by Montfort. The Parliament met at Oxford, where the so-called Provisions of Oxford were enacted, by whose terms the foreigners were required to surrender many of their estates and castles, Montfort himself losing Odiham and Kenilworth. The king repudiated the Provisions in 1261, but later agreed that Louis XI. of France should arbitrate the question, and that sovereign by the Mise of Amiens gave a decision favorable to the king. Montfort and the barons refused to submit without an armed contest. A battle followed on May 14, 1264, in which the king was not only defeated, but taken prisoner. Shortly after a Parliament of bishops, barons, and abbots was called to adjust the difficulties. The representation in that body was based upon certain towns and districts. Montfort and the people insisted upon a constitution in which representative government should be recognized. This Parliament was the beginning of the movements that led to a constitutional monarchy in England. The constitution formed at that time was accepted by the king on Feb. 14, 1265, but the barons were not satisfied. They immediately revolted. Montfort vigorously defended the constitution and was slain in battle at Evesham, Aug. 4, 1265. His memory has been perpetuated because of his devotion to representative government. He has been celebrated in song and poetry as Saint Simon.

MONTGOLFIER (mŏnt-gŏl'fĭ-ĕr), the family name of two brothers who are distinguished as inventors of the balloon. Joseph Michel Montgolfier was born at Vidalon-les-Annonay, France, in 1740, and died in 1810. Jacques Étienne Montgolfier was born at the same place in 1745, and died in 1799. They descended from a celebrated paper maker and became engaged in the industry of manufacturing paper. The two took a joint interest in studying the invention of a balloon that was to be inflated by rarefied air, and in 1782 made the first successful ascent on record with such a machine. Both secured distinguished honors and were admitted as members to the French Academy. Joseph was the inventor of the calorimeter, the hydraulic screw, and several other useful appliances.

MONTGOMERY (mŏnt-gŭm'ĕr-ĭ), the capital of Alabama, and the county seat of Montgomery County, on the Alabama River, 180 miles northeast of Mobile. It is on the Louisville and Nashville, the Central of Georgia, the Mobile and Ohio, the Western of Alabama, the Seaboard Air Line, and the Atlantic Coast Line railroads. The surrounding country has valuable deposits of iron and coal and produces large quantities of cotton, cereals, and stock. Steamboats ascend the Alabama River to Montgomery. The streets are regularly platted and improved by brick, stone, and asphalt pavements. It has an extensive system of electric street railways and is important as a market for cotton and farm produce. Among the manufactures are tobacco products, syrup, candy, brooms, flour, furniture, textiles, soap, oil, machinery, earthenware, and utensils.

Montgomery is well built and has many large business blocks. The noteworthy buildings include the State capitol, the county courthouse, the Masonic Temple, the Carnegie Library, the city hall, the State normal school, the La Grange Academy, the Federal building, the Estelle Hall, and the Montgomery Industrial School for Girls. A fine Confederate monument is located in the grounds of the capitol. Many fine churches, hospitals, and public schools are maintained. The State library contains a large collection of books. Montgomery was founded in 1817, when it was known as New Philadelphia, and the present name was adopted in 1819. It was incorporated in 1837. The capital was removed here from Tuscaloosa in 1847. It was occupied by the Union army in 1865. Population, 1900, 30,346; in 1920, 43,464.

MONTGOMERY, Richard, American general, born near Raphoe, Ireland, Dec. 2, 1736; died at Quebec, Canada, Dec. 31, 1775. He graduated at Trinity College, Dublin, and soon after entered the army. He came to America as a colonial soldier, was with General Wolfe at the siege of Louisburg in 1758, and in 1762 took part in the expedition against Martinique and Havana. In 1773 he settled in New York City, where he married the daughter of Robert R. Livingston, and in 1775 became a brigadier general in the continental army. While serving in Canada, he captured Saint Johns and Montreal, and shortly after was promoted to the rank of major general. In the latter part of 1775 he joined the army under Gen. Benedict Arnold, and on Dec. 31 an effort was made to capture Quebec by an assault. The enterprise failed, 400 Americans being captured. Arnold was wounded and Montgomery was killed in the engagement. The remains of Montgomery were buried at Quebec, but later Congress authorized their removal and the erection of a monument, which stands in front of Saint Paul's church, New York City.

MONTH, a period of time, originally equal to the interval between two new moons. This division of time afterward came to be called a *lunar,* or *synodical,* month and is equal on the average to 29 d. 12 hr. 44 min. 2.9 sec. The *sidereal* month is the interval occurring between two successive conjunctions of the moon with a particular fixed star. Its average length is 27 d. 7 hr. 43 min. 11.5 sec. The *anomalistic* month indicates a revolution of the moon from perigee to perigee, having an average length of 27 d. 13 hr. 18 min. 37.4 sec. The *solar* month is one of the twelve parts into which a solar year is divided, equaling 30 d. 10 hr. 29 min. 5 sec. The *calendar* month is fixed distinctly by law for ordinary purposes. Calculations of time by months have come down to us from remote antiquity, the lunar month being used mostly by the ancients. This form of calculation is still used extensively, notably by the Mohammedans and many other classes of Asia and Africa. The calendar months recognized by Europeans and now generally used by civilized nations were named by the Romans from various heroes and statesman. The following is a complete list:

NAME	SO NAMED FROM.	DAYS.
January	Janus	31
February	Februalia	28
February (leap years)	"	29
March	Mars	31
April	Aperire, meaning to open	30
May	Maia	31
June	Juno	30
July	Julius Cæsar	31
August	Augustus	31
September	Septem, meaning seventh	30
October	Oct, meaning eighth	31
November	Novem, meaning ninth	30
December	Decem, meaning tenth	31

It will be noticed from the above that September was originally the seventh month, October the eighth, November the ninth, and December the tenth. To aid in remembering the number of days in each month, the following rhymes were made in 1606, which have been employed quite largely in text-books:

Thirty days hath September,
April, June and November.
All the rest have thirty-one,
But February twenty-eight alone,
Except in leap-year once in four,
When February has one day more.

MONTICELLO (mŏn-tē-sĕl'lō), the name of the residence and estate of Thomas Jefferson, third President of the United States, located about three miles southeast of Charlottesville, Va. Jefferson personally designed the mansion, which was first occupied as a residence in 1770, though it was not fully completed until later. It occupies an eminence overlooking Charlottesville and the surrounding country, and was the home of Jefferson and his family for 56 years. After his death it passed out of the ownership of the family. Jefferson, his wife, and two daughters were buried on the estate.

MONTLUCON (môn-lü-sôn'), a city of France, capital of an arrondissement in the department of Allier, 45 miles northwest of Clermont Ferrand. It is located on the Cher River, has railway facilities, and is important as a commercial and manufacturing center. The streets are well improved and traversed by electric railways, and many of the buildings are modern and substantial. The manufactures include ironware, glass, clothing, chemicals, and machinery. Grain and fruit are grown in the vicinity. Population, 1922, 36,502.

MONTMORENCY (mŏnt-mŏ-rĕn'sĭ), **Anne, Duke of,** eminent general, born at Chantilly, France, March 15, 1492; died Nov. 12, 1567. He descended from one of the oldest and most noted noble families of France, was named Anne from his godmother, Anne of Brittany, and was the first member of the family to attain the ducal title. At the Battle of Melegnano, in 1515, he first showed distinguished ability, was captured with Francis I. in

1525 at the Battle of Pavia, and for eminent valor became constable of France in 1538. In 1541 he was banished from court on account of being suspected of favoring the dauphin, and spent ten years on his estate, but with the ascension of Henry II. he was again reinstated in his former positions of honor. He commanded the French army against Philip II. of Spain in 1557 at Saint Quentin, where he was defeated and imprisoned. The peace of 1559 restored him to freedom. Shortly after he joined the Duke of Guise in opposition to the regency of Catharine de' Medici. At that time he formed the famous triumvirate against the Huguenots and Condé, and was made prisoner by the Huguenots at the Battle of the Dreux in 1562. The following year he succeeded in expelling the English from Havre. In 1567 he gained a decisive victory over the Huguenots at Saint Denis, but the day following his death occurred from a wound received in battle.

MONTMORENCY, Falls of, a famous series of falls on the Montmorency River, a small stream of Canada, which rises in Snow Lake and flows into the Saint Lawrence eight miles below Quebec. The falls have a width of about 50 feet, and the main descent of water is over a precipice 265 feet high. The region is remarkable for its natural scenery and is a favorite summer resort. In the winter time the falls are increased in grandeur by vast ice formations, which are often 200 feet in height.

MONTPELIER (mŏnt-pē'lĭ-ĕr), the capital of Vermont, county seat of Washington County, on the Winooski River, forty miles southeast of Burlington. It is on the Central of Vermont, the Boston and Maine, and other railroads. It has a beautiful site, is surrounded by a farming and dairying country, and has a large trade in produce and merchandise. Among the noteworthy buildings are the State capitol, the county courthouse, the public library, the Montpelier Seminary, the Wood Art Gallery, the Heaton Hospital, and many fine schools and churches. The city has a fine park, pavements, public lighting, and systems of sewerage and waterworks. The manufactures include furniture, flour, leather, machinery, lumber products, earthenware, and vehicles. A fine statue of Ethan Allen adorns the portico of the State house. Montpelier was settled in 1787 and became the capital in 1805. Population, 1920, 7,125.

MONTPELLIER (môn-pā-lyā'), a city in France, capital of the department of Hérault, located a few miles north of the Gulf of Lions. It is built beautifully, has a large commercial trade, and is well connected by railroads with the trade centers of southern France and the coast. The manufactures include chemicals, cotton and woolen goods, perfumes, spirituous liquors, soap, leather, oil, and machinery. Among the principal buildings are the public library, the cathedral, the university, the commercial exchange, and the central railway station. The city was founded at an early date in European history. It is the seat of a medical school established by Arab physicians in the 12th century and a botanical garden which dates from the time of Henry VI. Montpellier was a center of Huguenot influence during the religious wars and on Oct. 20, 1622, the Edict of Montpellier confirmed the Edict of Nantes by granting religious freedom to the Protestants. Population, 1922, 87,114.

MONTREAL (mŏnt-rē-ăl'), the largest and most important city of Canada, in the Province of Quebec, 180 miles southwest of Quebec, on an island formed by the mouths of the Ottawa, which flows into the Saint Lawrence at this place. It is so named from Mount Royal, *Mont*

Réal, a prominent elevation near the city, which is utilized as a public park. The city is on the southeastern side of Montreal Island and on the Canadian Pacific, the Canadian National, and other railroads. It has a fine harbor and extensive wharves and is accessible by canals that permit the passage of the larger vessels to convenient points within the city. Steamboat connections are maintained with the principal cities of the Great Lakes and ocean liners ply regularly between its harbor and many foreign ports. Being located at the junction of many railways and at the termini of the inland and ocean navigation, it has commercial advantages which are rarely excelled.

The site of the city is a low tract of land, with a width of about two miles, but it rises gradually toward Mount Royal, which is 900 feet above sea level. The business portion is mainly on level ground, where some of the streets are irregular and narrow, but the residential portion is on a higher tract toward Mount Royal, giving that part a very beautiful appearance. Saint Lawrence Street divides the French from the English section, the former lying toward the east. McGill, Saint James,

CHURCH OF NOTRE DAME, MONTREAL

Facing the Place d' Armes is the great edifice of Notre Dame, which is one of the largest churches in America, seating 10,000 worshipers. To the right, as one faces the church, is the oldest building of Montreal, the Seminary of St. Sulpice, erected 1684. From the tower of Notre Dame, 227 feet high, can be seen a fine view of the entire city and its rural suburbs.

(Opp. 1840)

Notre Dame, Saint Paul, Bleury, Saint Catherine and Saint Lawrence are the principal business streets and are lined with many modern and substantial structures, the buildings being chiefly of gray limestone quarried in the vicinity. It has an extensive export and import trade, the latter being somewhat the larger. Among the chief imports are tea and sugar, raw cotton, woolen and silk goods, iron and hardware, and chemicals. The exports include grain, flour, lumber, boots and shoes, musical instruments, locomotives, and machinery. It has manufactures of flour and grist, furniture, brass and iron products, clothing, machinery, and spirituous liquors. Many of the streets are paved with granite and asphalt and are traversed by electrical railways that reach the principal parts of the city and many interurban points. Waterworks, sewerage, electric and gas lighting, and telephones are among the public utilities.

The city is beautified by many public squares and parks, including Logan, Viger Gardens, and Mount Royal parks. In Victoria Square is a fountain and a statue of Queen Victoria. The Church of Notre Dame is a fine structure, in fact one of the largest cathedrals in America, having ample accommodations for 10,000 people. The Cathedral of Saint James, commonly known as Saint Peter's, is modeled after Saint Peter's at Rome. Other buildings of note include the city hall, the courthouse, the customhouse, the Saint James' Methodist Church, the Jesuit Church, and the Seminary of Saint Sulpice, the oldest building in the city. Montreal is noted as an educational center, having many institutions of higher learning and numerous educational and scientific associations. The former include McGill University, with which are connected an observatory and a natural museum; the French College de Montreal; and the Roman Catholic Laval University. It is the seat of many professional and benevolent institutions, including schools of medicine and surgery, hospitals for the blind and feeble-minded, and institutions for orphans and adult invalids. As a center of publishing and printing it takes high rank. It has an extensive public and many institutional libraries.

The site of the city was occupied originally by an Algonquin village called Hochelaga. Champlain visited the place in 1603, but at that time the native village was in a state of ruin as the result of a battle between the Iroquois and Hurons. In 1642 the French founded the present city under the name of Ville Marie de Montreal, but it was captured by the British under General Amherst in 1760. The colonial troops captured it in the Revolutionary War, but they were dispossessed in 1777. The seat of government of Lower Canada was located at Montreal from 1844 until 1849, when it was removed to Quebec. A great fire destroyed four acres of the business section in 1901, but it was rebuilt rapidly and on a more substantial scale. About half of the inhabitants are French, the remainder being chiefly of English, Irish, and Scotch descent. Population, 1921, 618,506.

MONTREAL, an island of Canada, in Quebec, formed at the junction of the Ottawa with the Saint Lawrence River. The length is 30 miles; greatest breadth, 10 miles; and area, 197 square miles. The soil is fertile and productive and a large portion of it is utilized in orchards and gardens. Much of the surface is level, but Mount Royal, at Montreal, rises to a height of 900 feet above the sea. Montreal, the largest city in Canada, is located on the island.

MONTROSE (mŏnt-rōz'), **James Graham,** soldier, born on the family estate of Montrose, Scotland, in 1612; died May 21, 1650. He studied at the University of Saint Andrews and subsequently traveled in France and Italy. In 1637 he joined the Covenanters in their movement against Charles I., but he was won over to the side of the king in 1639, and soon after was created first Marquis of Montrose. He invaded Scotland with an army of Highlanders and Irish mercenaries, in 1644, and soon captured Dundee and Edinburgh, but the following year was defeated by David Leslie at Philiphaugh. In 1849 he invaded Scotland a second time, but met defeat at Invercarron the following year, when he was captured and hanged by his enemies.

MONTS, Pierre du Gast. See **De Monts.**

MONTSERRAT (mŏnt-sĕr-răt'), an island of the West Indies, one of the Leeward group, 34 miles northwest of Guadeloupe. The area is 32 square miles. The surface is mountainous, but it produces coffee, sugar, cacao, limes, and tropical fruits. Earthquakes are of frequent occurrence, and hurricanes are quite common, the latest of importance occurring in 1899, when three-fourths of the inhabitants were forced to depend upon the government for food. Plymouth is the capital and principal town. It was discovered by Columbus in 1493. The British established a settlement on the island in 1632. It is governed as a part of the British colony of the Leeward Islands. Population, 1922, 12,451.

MONTT (mŏnt), **Manuel,** statesman, born at Petoeia, Chile, Sept. 5, 1809; died in Santiago, March 13, 1881. He graduated at the National Chilean Institute, was engaged there as professor, and became president of the congress in 1841. In 1851 he was elected by the conservatives as president of Chile, in which office he served ten years. During that time he suppressed several rebellions, effected educational and political reforms, and encouraged internal improvements. He was succeeded by President Perez. After retiring from the presidency, he held the office of president of the supreme court until his death. His son, Jorge Montt, is known as an eminent sailor and statesman of Chile. He was born at Santiago in 1847, attained to

eminence as a seaman, and on Nov. 6, 1891, became president of Chile. His administration was one of peace and prosperity.

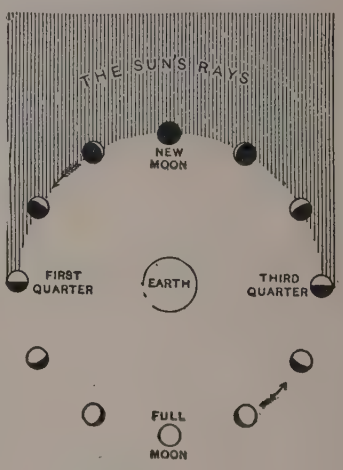
MOODY (mōō'dĭ), **Dwight Lyman,** evangelist, born in East Northfield, Mass., Feb. 5, 1837; died there Dec. 22, 1899. In his early youth he was employed as a farm hand, later became a salesman in Boston, and at the age of eighteen was converted to the Christian faith. In 1856 he settled at Chicago, where he engaged as salesman and affiliated with the Plymouth Congregational Church, in which he organized a Sunday school class. During the Civil War he did missionary work among the soldiers that recruited at Chicago and later among the sick and wounded at Shiloh, Murfreesboro, and Richmond. In 1865 he became president of the Chicago Y. M. C. A. This association constructed a large mission hall for him as a place to hold revival meetings, but it burnt in 1871, and, after the great fire, he erected on the same site a building costing $70,000.

Ira D. Sankey, a celebrated evangelistic singer, aided him materially in attaining successful results in the home mission field. They visited England in 1870 and 1883, where they held services that resulted in great religious awakenings. Among the various institutions established by him are the Northfield Seminary for Girls, the Mount Hermon School for Boys, the Farwell Hall, and the School for Bible Study at Northfield. Most of these institutions and others were established by funds collected as donations and from the proceeds of the sale of "Gospel Hymns," a work published by him and Sankey. In the Spanish-American War of 1898 he did effective work among the soldiers located in the southern states. Moody was not a trained theologian, but his teachings accorded with those of the orthodox church and his meetings were always on a union basis. It was his design to inspire men with faith and love by expressing in the plainest of English his favorite theme in relation to the love of God. It is doubtful whether any man of modern times did more than he to promote careful Bible study. Among his writings are "The Way of the Word," "The Second Coming of Christ," "The Way of God and How to Find It," and many volumes of sermons.

MOODY, William Henry, public man, born in Newbury, Mass., Dec. 23, 1853. He graduated at Phillips Academy, Andover, and Harvard University, and subsequently studied law. In 1878 he was admitted to the bar and began a successful practice in Haverhill, Mass. He was elected attorney for the eastern district of Massachusetts in 1890, serving until 1895, when he was elected to Congress as successor to General Cogswell. On the floor of the House he gained a reputation by his leadership and knowledge of parliamentary procedure, was a member of the Committee of Ways and Means, and was mentioned as a possible successor to Thomas B. Reed as speaker. In 1902 he was made Secretary of the Navy in the Cabinet of President Roosevelt, as successor to John D. Long, and in 1907 was appointed a justice of the Supreme Court. He died July 2, 1917.

MOON, the satellite of the earth, classed as one of the secondary planets. It revolves around the earth in an almost circular orbit once each sidereal month, at a mean distance of 238,818 miles. The least distance from the earth is stated generally at 221,593 miles and the greatest distance is 252,948 miles. So far as known the moon has an equal diameter in all directions, it being calculated by trigonometry at 2,160 miles. The surface area is about one-fourteenth that of our planet, or four and a half times that of the United States. The bulk of the moon is one-forty-ninth that of the earth, the mass is about one-eighty-first, and the mean density is about one-half. It would require fifty globes the size of the moon to equal the earth. A body weighing one pound on the surface of the earth would, if placed on the moon's surface, weigh about 2.65 ounces. All its light is received from the sun, hence moonlight is sunlight reflected from its surface. Owing to its brightness when lighted by the sun, it appears larger than it really is.

Since the moon turns once on its axis while going once around the earth, the lunar day is equal to twenty-nine and a half of our days, and the same side is always turned toward the earth. As it revolves round the earth it exhibits phases, these depending upon the extent of the illuminated portions that may be seen from the earth. *Full moon* occurs when it is exactly opposite the sun with the earth between; *last quarter,* when one-half of the illuminated surface, that is, one-quarter of the moon's surface, is seen; *new moon* when it is between the earth and the sun; and *first quarter* when only one-half of the illuminated portion is again visible. The moon is said to *wane* from full moon to new moon, and during the other half of its course it is said to *wax.* Eclipses of the moon and sun are due to the relative positions of the three heavenly bodies. An eclipse of the moon occurs when that body is obscured either wholly or in part by the shadow of the earth;



PHASES OF THE MOON.

and an eclipse of the sun takes place when the moon occupies a position between that body and the earth, the former phenomenon being possible only at or near full moon and the latter only at new moon. The *sidereal* period of the moon, that is, a complete revolution round the earth, is completed in 27 d. 7 hr. 43 min. 11.46 sec.; but the *lunar* month is longer than the sidereal by 2 d. 5 hr. 51.41 sec., owing to the advance made by the earth in its orbit between two successive conjunctions of the moon.

The closest telescopic examination has revealed no traces of organic life. It appears to have no clouds, no water from which they may be formed, and no atmosphere to support them. The exposure to the sun's rays and an absence of light and heat on the opposite side give rise to great extremes of heat and cold. Being nearer the earth than all other bodies of considerable size, the surface of the moon has been examined carefully by powerful telescopes, and every portion of its surface has been mapped and named by astronomers. Most of the surface visible to us is constituted of mountain chains, valleys, and extensive craters. Johannes Hevelius (1611-1687), of Dantzic, prepared the first lunar map, in 1647, and since then many photographs and maps have been made. Many of the mountain ranges are connected by chains running across valleys, but there are some isolated mountain peaks and a number of small clusters or groups of elevations. Some of the craters are from ten to twenty-five miles in diameter, and in many localities are crevices and cracks that appear to have been formed by volcanic action. It is thought that there are forty mountain peaks of the moon higher than Mont Blanc. The Leibnitz Mountains are regarded the highest, having elevations from 30,000 to 36,000 feet above the general surface, the whole system greatly exceeding in height any of the terrestrial peaks. The absence of an atmosphere tends to sharply define all objects on the surface, thus making it possible to measure with considerable accuracy the heights of mountains, their extent, the depth of numerous craters, their diameter, and many of the lunar landscapes.

The names applied to the different mountains, craters, and plains are those of celebrated astronomers and writers. Copernicus is the name of a crater which has a diameter of fifty miles and Eratosthenes is the name applied to one of the most celebrated mountains, having a height of nearly 16,000 feet. Anciently the moon was the subject of many superstitions. The time of planting cereals, beginning buildings, killing animals, pruning trees, gathering the harvest, and even forms of worship were determined by the moon's phases. However, as education spread it became apparent that all these, as well as predictions of the weather and other phenomena on account of the influence of the moon, are relics of ancient superstitions. Writers generally agree that it would take 600,000 full moons to equal in brilliancy the light of the sun, and that, if it has any influence on the weather, it is a slight tendency to produce clear nights at full moon. The most powerful telescopes now constructed are capable of bringing the surface of the moon within forty miles of the eye, which makes it apparent that a relatively close examination of its geography is quite possible.

MOONSTONE. See **Felspar.**

MOORE (mōōr), **George,** novelist and dramatist, born in Ireland in 1853. He studied in London and France and began his literary career by contributing to magazines, among them the London *Hawk*, for which he wrote articles under the title "Notes and Sensations." In 1877 he published his first volume of verse, entitled "Flowers of Parnassus," and later issued a volume under the title "Pagan Poems." However, he published but few verses aside from those contained in these two books and, instead, gave his time persistently to the critical study and active support of the revival of the Irish language. He is one of the founders of the Irish Literary Theater at Dublin and published the "Bending of the Bough," in which he gives support to the movement for the revival of the Celtic language and literature. He followed rather the French school than the English, and characterized the latter as given up to manner and social customs instead of being devoted to higher moral ideas. Among his publications are "Esther Waters," "Confessions of a Young Man," "Modern Painting," "Impressions and Opinions," "Spring Days," "Strike at Arlingford," "A Modern Lover," "The Celibates," and "The Untilled Field."

MOORE, Sir John, general, born in Glasgow, Scotland, Nov. 13, 1761; died Jan. 16, 1809. He was the son of a Scottish physician, entered the army in 1776 for service in Corsica, and later was transferred successively to the West Indies, Ireland, and Holland. In 1801 he accompanied the army to Egypt, where he served under Sir Ralph Abercrombie and was severely wounded, receiving for his gallantry the Order of the Bath. In 1808 he proceeded with an army of 11,000 men to assist the King of Sweden against the allied forces of Russia and France, and in the latter part of that year operated with a large army in Portugal and Spain against Napoleon. He concentrated his forces, which then consisted of 25,000 men, at Salamanca, but was soon compelled to retreat, for the reason that Napoleon had begun to move an army of 70,000 against him. Accordingly he proceeded through the mountain regions during a season of the year when storms made passage almost impossible, but safely reached Corunna. While there the French under General Soult made an attack upon him, but they were repulsed successfully However, General Moore was wounded while in action and died immediately after victory attended his efforts. He was knighted in 1805.

MOORE, Thomas, noted poet, born in Dub-

lin, Ireland, May 28, 1779; died Feb. 25, 1852. He was the son of a tradesman, studied in a grammar school, and graduated from Dublin University. In 1799 he entered Middle Temple, London, to undertake the study of law, and while there became prominently connected with a high class of society, a circumstance due to his musical talent. His first literary work was a translation of the "Odes of Anacreon," that appeared in 1800, and soon after followed the "Poetical Works of the Late Thomas Little." Through the influence of Lord Moira he secured the position of registrar of admiralty court at Bermuda, in 1803, an office he immediately accepted. Soon after he appointed a deputy to discharge the duties of that office and entered upon an extensive tour of the United States and Canada, and on returning to England he published his "Odes and Epistles," in 1806. Later he produced his celebrated "Irish Melodies," a work upon which his reputation is founded, though it was not entirely completed until 1834. This production netted him an annual income of $2,000, his "Lalla Rookh" brought him $15,000, and his "Life of Byron" yielded nearly $25,000. However, his deputy in the Bermudas embezzled $30,000 of government funds and, to escape arrest for debts, he made his home for a time in Italy.

In 1822 he returned to England and settled at Sloperton Cottage, in Wiltshire, where he resided the last thirty years of his life. Thomas Moore numbered among his warmest friends some of the most eminent literary men of his time, among them Jeffries and Byron. A pension of $1,500 was granted him in 1835. Among his works not named above are "The Fudge Family in Paris," "Loves of the Angels," "Life of Lord Edward Fitzgerald," "Life of Sheridan," "The Veiled Prophet," "Light of the Harem," "Travels of an Irish Gentleman in Search of a Religion," and "History of Ireland." Both the poetry and prose of Moore are clear, concise, and appropriate in language, and in many instances they reach a high degree of tenderness and majesty of vigor. Some of them have been widely translated. They are still popular in Europe and America.

MOORS, a race of people originating from the Mauri, the inhabitants of ancient Mauritania, who are thought by some writers to be the direct descendants from a class of Berbers known as the Amazirgh. Their language is Arabic and their religion is Mohammedan. At present they inhabit Morocco and the southern coast of the Mediterranean. In Spanish history the term Moor is used interchangeably with Arab and Saracen, since Mohammedan peoples from North Africa conquered the Visigoths in that country in 711 and governed the region until 1492. Later the Moorish forces invaded France, but they were defeated at Tours in 732 by Charles Martel. Moorish culture, industry, art, science, and customs prevailed in Spain for centuries, making that portion of Europe the center of commercial and educational activity at the time the Dark Ages characterized other parts of Europe.

At length the kingdoms of Castile and Aragon developed superior power under Christian influences, and the Moorish possessions were lost successively until they controlled only the region known as Granada. Their final downfall was effected in 1492 under Ferdinand the Catholic, and the Moors either colonized regions of Africa, or submitted to the Spaniards by adopting their customs and religion. However, revolts occurred at various times, and finally Philip III. expelled the remaining Moors by a decree in 1610. Fully 3,500,000 *Moriscos,* as their descendants were called, left Spain between 1492 and 1610, thus taking from that country the superior intellect and industry essential in maintaining its commercial, educational, and agricultural importance. This is assigned as the cause of the rapid decline in the importance of Spain, a condition from which that country has not yet fully recovered. The banished Moors established a foothold in the northern portions of Africa, where they founded the states of Barbary, and from their many cities and strongholds conducted expeditions against the Spaniards and other nations of Europe for centuries.

Many traces of Moorish industry and art still remain in Spain. The most prominent of their achievements is witnessed in the architecture still found in abundance in Granada and other parts of the Iberian peninsula in which they had possessions for some time. The Alhambra in Granada is the most notable and has an interior of great beauty and remarkable ingenuity, although its outer appearance is not particularly beautiful. Another structure of note is the Mosque of Cordova, which was founded in 786, but after the Moors were expelled from Spain it was converted into a cathedral. Many fine specimens of Moorish architecture are at Seville, notably the cathedral tower that was built in the latter part of the 12th century. See **Alhambra.**

MOOSE, the largest quadruped of North America, being a deer of the genus *Alces.* The male is much larger than the female, measuring about six feet at the shoulders and weighing about half a ton. It has a large head and bears flat antlers of large size. Although both sexes bear antlers, they are larger in the male than in the female. The legs are long and well fitted to move swiftly, but the animal has a somewhat awkward gait, and the short neck makes it necessary to bend the front legs somewhat while feeding on the ground. The general color is brown, but the legs are yellowish. In summer the animals live a solitary life, but in winter they are found in herds. These animals are timid when in a wild state, but become savage and dangerous when at bay. The moose somewhat resembles the elk of the Old World, but writers regard it a distinct species. The

killing of moose is now restricted by law and in some states of the United States and a number of provinces of Canada it is prohibited. Formerly these animals ranged throughout the north central part of North America, but they are now scarce in the United States and are becoming limited to the northern section of Canada and Alaska.

MOOSEHEAD LAKE (mōōs'hĕd), the largest body of water in the State of Maine, being thirty-five miles long and from two to thirteen miles wide. It is the source of the Kennebec River, receives the water from several adjacent lakes by the Moose River, and on its eastern shore are a number of prominent elevations, of which Mount Kineo, height 4,125 feet, is the most noted. Fine fish are abundant. A railway line along its southwestern shore has stimulated a material development of the region.

MOOSE JAW, a city of Saskatchewan, 45 miles west of Regina, on the Canadian National and the Canadian Pacific railroads, and on several surfaced highways. The surrounding country produces grain, coal, and live stock. It has machine shops, iron works, brick yards, foundries, flour mills, elevators, and stock yards. The features include the high school, city hall, courthouse and three colleges. It has paving, sewerage, electric lights and railways, and extensive trade. It was settled in 1882 and incorporated in 1903. Population, 1925, 20,640.

MORAES BARROS (mô-rīsh' bär'rôs), **Prudente José de,** statesman, born in the state of Sao Paulo, Brazil, in 1845. In 1894 he was elected president of Brazil to succeed President Peixoto.

MORAINE (mô-rān'), a term originated from the German word *mur,* meaning débris, and applied to the accumulation of stone and earth deposited by a glacier. In some places these deposits form high walls or embankments. They are called *lateral* moraines, when deposited along the margins of a glacier. Two or more glaciers flowing in the same ravine sometimes unite or crowd together the inner lateral moraines, when they are known as *medial* moraines. *Terminal* moraines are those deposited at the lower extremities, owing to the melting of the glacial ice.

MORALITY PLAYS. See **Mysteries.**

MORAN (mô-răn'), **Patrick Francis,** cardinal, born at Leighlinbridge, Ireland, Sept. 16, 1830; died Aug. 16, 1911. He was educated at the Irish college of Saint Agatha, Rome, and afterward became a professor and vice president of this institution. Later he was an instructor at the College of the Propaganda, Rome, and was made Bishop of Ossory in 1872, serving until 1884, when he was made Archbishop of Sydney, Australia. The following year he became a cardinal. His publications are very numerous. They include "Essays on the Origin of the Early Irish Church," "Irish Saints in Great Britain," "History of the Catholic Archbishops of Dublin," "Historical Sketches of the Persecutions Under Cromwell and the Puritans," "History of the Catholic Church in Australasia," and "The Priests and People of Ireland."

MORAN, Thomas, etcher and painter, born at Bolton, England, Jan. 12, 1837. He came to Philadelphia with his parents at an early age, where he was apprenticed to a wood engraver. Subsequently he studied in London, Paris, and Italy and made landscape painting a specialty. In 1871 he returned to the United States and painted a number of sketches now in the Capitol at Washington, entitled "The Grand Cañon of the Colorado" and "The Chasm of the Colorado," for each of which he received $10,000. He was made a member of the National Academy in 1884 and was elected to membership in several foreign societies. Among his later paintings are "The Track of the Storm," "Conemaugh in Autumn," "New York from Communipaw," "The Mountain of the Holy Cross," "The Children of the Mountain," and "Ponce de Leon in Florida." He died Aug. 26, 1926.

MORAVIA (mô-rā'vĭ-â), a state of the republic of Czecho-Slovakia. It is bounded on the north by Bohemia and Silesia, east by Hungary and Silesia, south by Hungary and the duchy of Austria, and west by Bohemia. The boundaries are formed largely by mountain ranges. It has an area of 8,578 square miles and consists mainly of a high plateau. The larger part of the surface slopes toward the south and the drainage is wholly by tributaries of the Danube. Mining, manufacturing, and agriculture are important industries. The mines yield graphite, coal, iron, lead, and copper. Flax, rye, barley, potatoes, fruits, and sugar beets are the chief crops. Cattle, sheep, horses, and poultry are reared extensively. The manufactures consist of cotton and woolen goods, silk and linen fabrics, wine, beet sugar, and machinery. Moravia was a fief of Bohemia until 1526, when it was made a crown land of Austria. About seventy per cent. of the inhabitants are slavs and the remainder are Germans. Roman Catholicism is the religion of a majority of the people. Brünn is the capital and chief city. Olmütz is a commercial and manufacturing center. Population, 1920, 2,620,914.

MORAVIAN BRETHREN, a religious sect founded by the immediate followers of John Huss in Bohemia. They are also called *Herrnhuters,* from the town of Herrnhut, built by them in Saxony, which has continued until the present time to be the principal seat of their influence and educational institutions. They are closely allied to the Lutheran Church, but differ from it in discipline and some minor points of religious doctrine. It is their aim to embrace simplicity in manners and earnest piety, and to pursue the study and practice of religion with great earnestness. As missionaries they have attained to much influence, having

stations in all the continents and many islands. Their schools are highly efficient institutions of learning, and are characterized by the devotion of their teachers and the high degree of morality in culture. Numerically the principal adherents of the Moravian Church are in America, Germany, and England, the total number being estimated at 225,000. In the United States there are 125 churches, with 140 ministers and 24,968 communicants.

MORAY (mŭr'ĭ), **James Stuart, Earl of,** born in Scotland about 1533; assassinated Jan. 20, 1570. He was the son of James V. of Scotland, became the leader of the Protestant party in 1556, and later was selected as prime minister for Mary, Queen of Scots. When the queen married Darnley, in 1565, he opposed that union with much vigor and even organized armed resistance to the royal party, but, after a signal defeat, was compelled to seek safety in England. In 1567 he returned to Scotland to become regent while Mary was a prisoner. Subsequently he was made a commissioner to guard the interests of the queen while she was in custody in England, and willingly agreed to testify against her in the complications that led to the murder of Darnley. His death resulted from a wound received from a shot fired by James Hamilton, who was thought to be acting in accord with the wishes of friends of the queen.

MORAY FIRTH (mŭr'ă), an inlet of the North Sea, extending into the northeastern part of Scotland. It is about forty miles long and sixteen miles wide and is noted for its fisheries. The Beuly River flows into it. Large steamers ascend as far as Inverness.

MORDANTS (môr'dạnts), the name of certain substances used in dyeing and calico printing. They serve to fix the colors that have no affinity for the fabrics. The term is applied in gilding to any sticky matter used to making gold leaf adhere. The mordants used commonly include alum, ferric nitrate, ferrous acetate, stannic chloride, tannic acid, and potassium. The term *fatty acids* is applied to the salts of sodium or potassium dissolved in water.

MORE, Hannah, author and philanthropist, born in Stapleton, near Bristol, England, Feb. 2, 1745; died in Clifton, Sept. 7, 1833. She was the daughter of a village school teacher, under whose influence she acquired an early education, and soon developed much ability as a writer of verses. In 1773 she published a pastoral drama, entitled "The Search after Happiness," and the following year completed a tragedy called "Regulus." Her ability as a writer brought her into contact with Garrick, Johnson, Reynolds, and Burke, but her life in London became distasteful to her and she accordingly settled near Bristol. There she developed a taste for serious and practical compositions, many of which attained to much popularity. As a philanthropist she organized a number of schools, aided in founding charitable institutions, and devoted $50,000 of her earnings to benevolent enterprises. Her writings embrace "The Fatal Secret," "Sacred Dramas," "The Shepherd of Salisbury Plain," and "Coelebs in Search of a Wife."

MORE, Sir Thomas, author and statesman, born in London, England, Feb. 7, 1478; beheaded July 6, 1535. He was the son of Sir John More, justice of the queen's bench, and became a page in the house of Cardinal Morton, Archbishop of Canterbury. He entered Oxford in 1497, where he laid the foundation for an active literary and public career. Afterward he became a student of law, completing the course at Lincoln's Inn. Even as a youth it was said of him, "There is but one wit in England, and that is young Thomas More." His diligent study, both in and out of educational institutions, won for him a profound scholarship, and his earnest piety and good humor made him many friends. A diligent student of Latin and Greek, he was supported vigorously by progressive scholars when he championed the introduction of the study of Greek into the universities of England. He had won the lasting friendship of Erasmus while at Oxford, and soon after completing his educational studies was recognized as a leading scholar. With the accession of Henry VIII. to the throne, he was promoted rapidly. He became undersheriff of London, served in Parliament, and was made ambassador to Holland. In rapid succession he rose until he became Treasurer of the Exchequer, was made speaker of the House of Commons, and in 1529 succeeded Wolsey as Lord Chancellor. Not only did Henry favor him politically, but he likewise showed a friendship for his society and paid him a number of visits at Chelsea. When Henry sought to divorce Catharine of Aragon, the two became estranged, and, when the monarch formed a marriage contract with Anne Boleyn, he refused to acknowledge its validity.

The attack made by Henry upon papal supremacy did not cause More to deviate from the dictates of his conscience, but he supported the established system of religion. His refusal to take the oath to acknowledge Henry as head of the church caused his imprisonment, and neither the eminence of his position nor his former intimacy with the king saved him from execution. He was accordingly committed to the Tower, tried for treason, and beheaded. Though imprisoned and endangered, his ready wit did not leave him, a fact nicely illustrated by his statement as he climbed the scaffold to bow beneath the headman's ax, when he said: "I pray you see me safely up, and for my coming down let me shift for myself." The writings that made Sir Thomas More famous are "Life of Edward V." and "Utopia." The former is written in a most remarkable literary style and is regarded by many as the finest example of good English. The latter was written in Latin, but

has been translated by various writers. It is a romantic description of the ideal state of a republic on an island, where the laws, political and social, are in strict accord with philosophical perfection.

MOREAU (mō-rō'), **Jean Victor,** eminent general, born at Marlaix, France, Aug. 11, 1763; died at Laun, Bohemia, Sept. 2, 1813. He was the son of a noted jurist, studied law at Rennes, and became an early advocate of the Revolution. In 1793 he displayed much tact in commanding a battalion of volunteers, and was accordingly dispatched the following year to command an expedition into Belgium and Holland. He became chief commander of the forces on the Rhine and Moselle in 1796, when he not only drove the Austrians to the Danube but threatened Vienna, and later secured control of the countries on the Rhine for France. In 1799 he commanded the French forces in Italy, where by exceptional strategic power he operated with success against the allied forces of Austria and Russia. However, he was succeeded by Joubert, but, after the death of that general, again displayed rare ability in conducting a retreat of the defeated army into France. The Directory offered him the dictatorship of France, but he declined in order to assist Napoleon. In 1800 he was again placed in command of the army of the Rhine, when he won the celebrated Battle of Hohenlinden. In 1804 he was accused of being implicated with Cadoudal and Pichegru in a conspiracy against Napoleon, and, though there was insufficient evidence, the trial resulted in his exile. Accordingly he came to America and resided for some years on an estate in Pennsylvania. Later he returned to Europe for the purpose of assisting the allied armies in the contest against Napoleon, but in 1813, while on a march to Dresden with the King of Prussia and the Czar of Russia, he was mortally wounded.

MORELIA (mō-rā'lē-ä), or **Valladolid,** a city of Mexico, capital of the state of Michoacán, 125 miles west of the city of Mexico. It is located in a beautiful valley, has a favorable climate, and is conveniently connected by railways. The features include the city hall, the state capitol, the theater, the cathedral, and the College of San Nicolas de Hidalgo. Among the manufactures are flour, utensils, clothing, jewelry, and lumber products. It has a large trade in merchandise. The place was founded in the 17th century. Population, 1920, 39,116.

MORGAN, Daniel, soldier, born in Hunterdon County, New Jersey, in 1736; died July 6, 1802. He served as a teamster in the army under Braddock in 1755 and later took part in the campaigns against the French and Indians. In 1775 he was made captain of Virginia volunteers and fought under Arnold at Quebec, where he was captured. He was exchanged in 1777, when he took part in the Saratoga campaign, and later fought under Washington and Gates. In 1780 he served under General Greene at the Battle of Cowpens, where he distinguished himself in a victory over Colonel Tarleton. Later he commanded in the Whisky Insurrection and in 1796 was elected to Congress.

MORGAN, Edwin Dennison, statesman, born in Washington, Mass., Feb. 8, 1811; died in New York City, Feb. 14, 1883. He entered upon a successful business career as a merchant at Hartford, Conn., when only seventeen years of age, but later removed to New York City. Soon after he became interested in politics. He was a member of the State senate from 1850 until 1853, became Governor of the State in 1858, and personally supervised the equipment of 2,300 soldiers for service in the Civil War. He was United States Senator from 1863 to 1869. By strict devotion to business enterprises he became the possessor of much wealth, and, besides supporting many benevolent enterprises, left by will $795,000 to found and support institutions devoted to religion and charity.

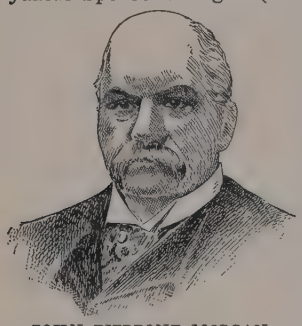
MORGAN, Henry, buccaneer, born in Glamorganshire, Wales, in 1635; died in 1690. He was taken from Bristol to Barbadoes by kidnappers when a boy and later worked his way to Jamaica, where he joined the buccaneers. The Governor of Jamaica sent him on an expedition to Cuba, where he sacked Puerto Principe and later captured Puerto Bello, in Panama. In 1670 he sailed with 37 vessels and 2,250 men from Santo Domingo to the island of Santa Catalina, which he captured, and thence went to the Isthmus of Panama. He crossed the isthmus in 1671 and appeared before Panama, which he captured and burned. With a booty of $2,000,000 he returned to Jamaica, whence he went to England, where he was knighted by Charles II. and subsequently served as lieutenant of Jamaica. He published "The Voyage to Panama."

MORGAN, Henry James, author, born in Quebec, Canada, Nov. 4, 1842; died in 1913. He studied at Morrin College, in Quebec, and soon after entered the civil service. For some time he was keeper of the state records and later chief clerk in the department of state, but retired on a pension in 1895, after a public service of 32 years. During this time he gave much attention to literary work and published many pamphlets and books. His books include "Sketches of Celebrated Canadians," "The Bench and Bar of Canada," "Tour of the Prince of Wales in Canada and the United States," "Canadian Men and Women of the Times," "The Dodd Family in Canada," "The Industrial Politics of America," and "Types of Canadian Women."

MORGAN, John Hunt, soldier, born in Huntsville, Ala., June 1, 1826; slain Sept. 4, 1864. His parents settled in Kentucky while he was yet a child. He volunteered his service at the beginning of the Mexican War, in which he took part as first lieutenant of cavalry. When the Civil War began, he organized a cavalry

force for the Confederates and made a number of raids through Ohio, Kentucky, and Indiana. His raid into Ohio was not successful and terminated in his capture, in 1863, and he was confined for a time in the Ohio penitentiary at Columbus. Shortly after he made his escape by digging a tunnel under the walls and immediately organized another raid into Tennessee, where his force was surprised at Greenville and he was shot. His band of troops became known as "Morgan's Guerrillas" and was the means of spreading terror through many regions.

MORGAN, John Pierpont, financier, born in Hartford, Conn., April 17, 1837. His father, Junius Spenser Morgan (1813-1890), was a business man and financier and for many years was head of the banking firm of J. S. Morgan & Co. The son attended public schools in Boston and subsequently studied at the University of Göttingen, Germany, and in 1857 returned to America to enter the banking firm of Duncan, Sherman & Co., New York City. He was made agent for the London banking house of his father and in 1871 became partner in the banking firm of Drexel, Morgan & Co., which was afterward changed to the firm of J. P. Morgan & Co. In 1895 he formed a syndicate to purchase United States bonds with the view of maintaining the legal gold reserve, and in this movement he was supported by many American bankers. He gave $50,000 to establish a free library at Hartford, Conn., and made munificent gifts to the Harvard Medical School and several hospitals in New York City. The United States Steel Corporation and the Northern Securities Company are among the vast combinations in which he was interested. He died Mar. 31, 1913.



JOHN PIERPONT MORGAN.

MORGAN, John Tyler, public man, born at Athens, Tenn., June 20, 1824; died June 11, 1907. In 1833 he removed with his parents to Alabama, where he received an academic education, and in 1845 was admitted to the bar and practiced his profession successfully. He took considerable interest in state politics and attended the convention of Alabama which passed an ordinance seceding from the Union. At the beginning of the war he enlisted as a private for service in the infantry of the Confederate army, was promoted successively until he attained the rank of brigadier general, and subsequent to the war resumed the practice of law at Selma, Ala. He was elected to the United States Senate in 1876 and served in that body continuously until his death. As a public man he took much interest in foreign affairs and as leader of the minority.

MORGAN, Junius Spenser, banker, father of John Pierpont Morgan, born in Holyoke, Mass., April 14, 1813; died in Monaco, Europe, April 8, 1890. He entered a business house at Boston when a boy, was employed in a bank in 1834, and later founded a dry goods establishment in Boston. In 1853 he became associated with the banking house of George Peabody in England, which later developed into one of the most important financial establishments of the world. He utilized much of his wealth in support of religious and charitable enterprises, and gave valuable works of art to the New York Metropolitan Museum of Art.

MORGAN, Thomas Jefferson, soldier and churchman, born in Frankfort, Ind., in 1839; died July 13, 1902. He attended public schools and Franklin College and took a course at the Rochester Theological Seminary. At the beginning of the Civil War he enlisted for service in the infantry and was a lieutenant under Col. Benjamin Harrison. He was commander of the first colored brigade of the army of the Cumberland, with which he rendered efficient service.

MORGANTOWN, county seat of Monongahela County, West Virginia, 102 miles south of Pittsburgh, Pa., on the Monongahela River and on the Baltimore and Ohio and other railroads. It has gas and electric plants, paving, machine shops, glass factories, woolen and flour mills, and extensive clay works. The features include the high school, public library, courthouse, and West Virginia University. It was incorporated in 1783. Population, 1920, 12,117.

MORGARTEN (môr-gär't'n), a mountain slope in Switzerland, in the canton of Zug, near Lake Egeri. It is celebrated for a victory won by the Swiss on Nov. 15, 1315, over an Austrian army of 50,000. The Swiss numbered only 1,400, but they had possession of the narrow pass that winds between the lake and Morgarten Hill, a fact of which their gallant warriors took due advantage.

MORGHEN (môr'gĕn), **Raffaello Sanzio Cavaliere,** noted engraver, born in Florence, Italy, June 19, 1758; died April 8, 1833. He descended from a German family and secured his first training in engraving under his father, but later studied at Rome. After developing his powers, he produced many excellent works of art, and was granted a liberal pension by the government. He was patronized by many of the prominent men of his time, including Napoleon, to whom he dedicated his masterpiece, entitled "The Transfiguration," upon which he devoted care and attention for a period of sixteen years. His works include 254 engravings, among them being "The Last Supper," "Madonna del Sacco," "Theology," "Poetry," and "Madonna della Seggiola."

MORIAH (mŏ-rī'à), **Mount,** a name applied in the Scriptures to the hill on which Solomon

built the temple at Jerusalem. It is a part of the present city and is the site of the Great Mosque of Jerusalem, which is one of the principal attractions for the Moslem world. Near Mount Moriah is an intermittent spring known as Virgin's Fountain, from which the water passes by an aqueduct into the Pool of Siloam.

MORLEY (môr'lĭ), **Henry,** author and educator, born in London, England, Sept. 15, 1822; died there May 24, 1894. He studied at King's College, London, and in Germany, and later entered upon the practice of medicine. In 1848 he became editor of the *Examiner,* contributed extensively to various periodicals, and in 1865 was selected as professor of English literature and languages at University College. After 1889 he devoted his time exclusively to literature and lecturing. His productions include a number of biographies, historical works, translations, and compilations of various important historical and literary writings, all of which have had a wide reading. Among them are "Sketches of Russian Life," "English Writers before Chaucer," "Library of English Literature," "Cornelius Agrippa," "Journal of a London Playgoer," and "Morley's Universal Literature."

MORLEY, John, author and statesman, born in Blackburn, England, Dec. 24, 1838; died Sept. 23, 1923. He studied at Oxford for the bar, but made literature his profession. In 1867 he became editor of the *Fortnightly Review,* secured a like position on the *Pall Mall Gazette* in 1880, and from 1883 to 1885 edited *Macmillan's Magazine.* In the meantime he edited about forty volumes of a series entitled "English Men of Letters," produced a large amount of original work, and attracted attention as a lecturer. He entered Parliament in 1880, where he supported the Home Rule policy of Gladstone, and in 1886 became Chief Secretary for Ireland. Morley displayed marked ability and exercised much influence in shaping the policy of his party in Parliament and before the people, usually taking an independent position, which he maintained with vigor and decision. He gave support to Gladstone in 1890, lost his seat at the general election in 1895, but in 1896 was returned from an election district in Scotland. His writings not mentioned above include "Study of Literature," "On Compromise," "Treatises on Voltaire and Rousseau," "Diderot and the Encyclopaedists," "Edmund Burke," "Collected Works of Morley," and "The Struggle for National Education."

JOHN MORLEY.

MORMONS, or Church of Jesus Christ of Latter Day Saints, a religious organization whose tenets are based upon the Bible and the Book of Mormon. Joseph Smith was the founder of the Mormons, in 1830. In 1820, when Smith was only fifteen years of age, he asserted that the first two persons of the Divine Trinity had communicated with him in person, and had placed upon him the duty of prophesying to the people. Numerous revelations were made to him from 1823 until 1827. In the latter year the golden plates of the Book of Mormon were placed in his hands, and he received two stones in silver bows resembling a pair of spectacles, called the *Urim* and *Thummim,* and by looking through them he was enabled to read the contents, while an assistant wrote them in the English language. The original Book of Mormon consisted of golden plates about eight inches in length and seven in width. These plates were constructed of thin sheets and fastened by three golden rings. The entire volume had a thickness of six inches. However, a portion of its contents was sealed. He received a revelation only of the unsealed part, and the other part was reserved to be revealed when future occasion makes it essential to the general welfare of man. Smith called the language of the book Reformed Egyptian, and it was claimed that the characters used in the writing were executed elegantly, but of small size.

In 1830 the first edition of the Book of Mormon was published at Palmyra, N. Y. On the last few pages appeared the testimony of witnesses who claimed to have seen the original book. The testimony consisted of a statement signed by David Whitmer, Martin Harris, and Oliver Cowdery. Its purport was that they had seen the plates from which the book had been translated and that they had been handed down from heaven by an angel. This testimony was supplemented by the evidence of eight persons who asserted the authenticity of the statement. Oliver Cowdery was the associate of Smith and wrote the words as dictated by him, and the eight witnesses included Joseph Smith's father and two brothers. It is asserted that Joseph Smith and the eleven different persons he referred to are the only ones that saw the plates of the original book before they were returned to the angel who had brought them to Joseph. Opponents to the new faith sprang up rapidly, and it was asserted that the money to publish the Book of Mormon was furnished by a farmer named Harris with the view of securing profit. Some claimed that several of the witnesses were induced to make a declaration that their former testimony regarding the authenticity of the original manuscript is untrue. However, converts to the faith were rapid and a large number of zealous adherents sprang up in various parts of the United States.

The Book of Mormon is so named from Mormon, the prophet who is represented as the his-

torian of his people. The record assumes to give a history in relation to America from the building of the Tower of Babel, and recites that a Jew named Lehi led a band of Israelites from Jerusalem to America about 600 B. C. His son, Nephi, is claimed to be the founder of a race of people that includes the North American Indians. It is asserted that Christ appeared to this people after the crucifixion, ministered to them, and established his church. Dissensions among the people led many to forsake the true faith, some embracing idol worship, and at last great contests arose that terminated in a series of battles in New York, the last occurring in Ontario County, in which nearly all followers were exterminated. The prophet Moroni was one of the few survivors and he wrote a record of the principal events of his time.

The Mormons represent their own tenets as follows: "We believe in God, the Eternal Father, and his son, Jesus Christ, and in the Holy Ghost. We believe that men will be punished for their own sins and not for Adam's transgression. We believe that through the atonement of Christ all men may be saved by obeience to the laws and ordinances of the Gospel. We believe that these ordinances are: Faith in the Lord Jesus Christ; repentance; baptism by immersion for remission of sins; and laying on of hands for the gift of the Holy Ghost. We believe that a man must be called of God to prophesy and by the laying on of his hands, by those who are in authority, to preach the Gospel and administer the ordinances thereof. We believe in the same organization that existed in the primitive church; apostles, prophets, pastors, teachers, and evangelists. We believe in the gift of tongues, prophecy, revelation, visions, healings, interpretation of tongues, and other miracles. We believe the Bible to be the word of God, as far as it is translated correctly; we also believe the Book of Mormon to be the word of God. We believe all that God has revealed, all that He does now reveal, and we believe that He will yet reveal many great and wonderful things pertaining to the kingdom of God. We believe in the literal gathering of Israel and in the restoration of the ten tribes, that Zion will be built upon this continent, that Christ will reign personally upon the earth, and that the earth will be renewed and receive its paradisic glory. We claim the privilege of worshiping Almighty God according to the dictates of our own conscience, and allow all men the same privilege; let them worship how, where, or what they may. We believe in being subject to kings, presidents, rulers and magistrates, in obeying, honoring and sustaining the law. We believe in being honest, true, chaste, benevolent, virtuous, and in doing good to all men; indeed, we follow the admonition of Paul: 'We believe all things, we hope all things;' we have endured many things, and hope to be able to endure all things. If there is anything virtuous, lovely, or of good report, or praiseworthy, we seek after these things."

In 1851 a division resulted from the publication of a revelation authorizing polygamy. According to this revelation two classes of marriages were recognized—one a spiritual and eternal, the other a temporal for this life. *Eternal* marriages were held to exist as a relationship having no end, while *temporal* marriages were looked upon as joining the contracting parties until they are divorced by death. Those denying the authenticity of this revelation constitute the Reorganized Church of Latter Day Saints, whose principal seat is at Lamoni, Iowa. Another division of the church occurred in Utah in 1869, when many withdrew from the so-called spiritual priesthood of Melchisedec and organized the Church of Zion.

The history of Mormonism presents many incidents of devotion and endurance. Six members formed the first church at Fayette, Seneca County, N. Y., on April 6, 1830, but shortly after they removed to Kirtland, Ohio. There converts gathered from various states and the church was formally organized in 1833 under the First Presidency. Brigham Young was chosen as evangelist and in 1835 was included with the twelve apostles. Missionaries were sent to various portions of the United States and England, but financial troubles in a bank established at Kirtland and a series of contentions with opponents caused the Mormons to form a settlement at Independence, Mo., where nearly all of them located in 1838. Local trouble caused the Governor of the State to order them from Missouri, and they immediately formed a settlement in Hancock County, Illinois, which they named Nauvoo. Within a short time 15,000 adherents had collected in the settlement. In the meantime the revelation regarding polygamy was promulgated, which aroused much opposition. Disputes regarding taxation under the laws of Illinois likewise tended to complicate matters.

Joseph and Hyrum Smith were placed under arrest for violations of law and while in jail at Carthage a mob shot both on June 27, 1844. It was necessary to call out the State militia to quell the disturbances that followed, but Brigham Young, the new leader, organized an exodus in 1846, and led about 1,000 families to the far west. In 1847 they reached the region of Great Salt Lake, where they settled and have since maintained their center of activity. In developing the natural resources of Utah the Mormons have shown much endurance and industry, built many thriving cities, redeemed waste lands by irrigation, constructed vast improvements, and built schools and homes for worship. In 1853 they laid the cornerstone for a beautiful temple at Salt Lake City, which was dedicated in 1893. It is a magnificent structure of gray granite, is lighted by electricity, contains a fine and substantial finish, and cost about $12,000,000. Missionary work is a leading fea-

ture of the Mormon Church. The membership at present includes 575,000 communicants, about one-half of them being resident in Utah, and the others in the different states, but particularly in Arizona, Missouri, Nevada, and Idaho. In 1890 President Woodruff issued a proclamation by which polygamy was declared no longer a tenet of the Mormon Church. See **Latter Day Saints.**

MORNING GLORY, a family of climbing plants, including many species. They are familiarly known as favorite flowering plants and are cultivated extensively in gardens. The vines

MORNING GLORY.
VINE. FLOWER.

climb to heights of from ten to twenty feet and produce funnel-shaped flowers of white, purple, pink, blue, and variegated colors. They are of especial beauty in the morning, when the flowers are full-blown. This family of plants includes the curious parasitic twiners known as *dodders.*

MOROCCO (mŏ-rŏk'kō), one of the capitals of Morocco, in Africa, the others being Fez and Mequinez. It is situated on a fertile plain, near the Tensift River, 250 miles southwest of Fez. Formerly it was well protected by a wall of stone and earth, but it is now in a dilapidated condition. The streets are narrow and unpaved, the buildings are constructed principally with flat roofs, and the architecture is mainly of earth and stone. Anciently it was one of the most flourishing cities of the Moslem world, which is indicated by many ruined buildings, but in the main the city has few traces of former greatness and prosperity. However, its site is one of much beauty and commands a fine view of the surrounding country. In its vicinity are magnificent gardens, groves, and fields. The manufactures include leather, clothing, carpets, earthenware, textile fabrics, and utensils. Its market places are crowded with bazaars. The government palace is an extensive and beautiful structure. It has several public elementary schools and a large number of mosques. Morocco was founded in 1072 by Abubekr ben Omar. Its greatest prosperity was attained in the 13th century, when it was a vast business emporium. At that time it was the chief seat of learning in Northwestern Africa and contained fully 725,000 inhabitants. Its decline is due to continuous civil strife with peoples of Northern Africa and Spain. Population, estimated, 56,500.

MOROCCO, a country in the northwestern part of Africa, bounded on the east by Algeria, south by the Sahara Desert, and west and north by the Atlantic Ocean and the Mediterranean Sea. It is separated from Spain by the Strait of Gibraltar, which forms a narrow channel between Europe and Africa, and a portion of the southern boundary is formed by the Draha River. Some uncertainty still exists as to the exact situation of its southern boundary, on account of which the entire area cannot be stated accurately, but the most recent estimates place it at 234,000 square miles. The Draha and Morbeja are the principal rivers. The drainage is almost exclusively into the Atlantic, only a small portion of the coast plain being drained into the Mediterranean. All the streams flow rapidly, many of them being characterized by cataracts. The Atlas Mountains trend through the interior, about midway between the coast and the Sahara, forming not only the watershed, but also protecting the coast regions from the hot winds that sweep across the Sahara Desert. The highest peaks are from 10,000 to 13,000 feet above sea level. In many sections they are penetrated by valleys of much fertility and luxuriant vegetation.

Morocco is rich in valuable timber, including cork oak, esculent oak, cedar, Aleppo pine, and several species of palm trees. It contains extensive deposits of rock salt, iron, copper, gold, silver, lead, antimony, tin, and mineral oils. The coast region has a fertile soil and favorable climate, but in many localities the summer heat is intense and in some parts irrigation is necessary, but there is an abundance of small mountain streams that supply the necessary quantity of water for that purpose. Among the agricultural products are tobacco, cotton, wheat, rice, barley, maize, sugar cane, hemp, and many varieties of tropical fruits, including the fig, orange, lemon, pomegranate, and grapes. Large herds of domestic animals are reared, especially in the pastoral regions, the principal interests being vested in cattle, sheep, camels, goats, asses, mules, and Moorish horses. Field labor is done mostly by oxen and bulls and transportation is principally by the camel. The country has manufactures of leather, Fez caps, pottery, embroidery, carpets, cotton and woolen goods, edged tools, and utensils. Commercial relations are sustained with most of

the European countries. Much of the internal trade is in the hands of Jews and Europeans and the freighting is chiefly by caravans and coasting vessels.

The government is a restricted monarchy. Chief executive is vested in the Sultan, who has unrestricted control of religious affairs, and in the management of the state he is assisted by a cabinet of six ministers. An army of 12,000 men is maintained, consisting of 2,000 cavalry and 10,000 infantry. The revenues are derived by taxes and tariffs on foreign trade, the latter amounting to about $1,800,000 per year. Fez and Morocco are centers of the caravan trade, and commerce with Europe is carried on at the ports of Rabat, Tetuan, Safi, and Tangier. At present the imports are estimated at $6,250,000 and the exports at $5,100,000 per annum. Trade with European nations is chiefly with Great Britain, France, Germany, Belgium, and Spain, in the order stated. Nearly all the native population is Mohammedan. The Europeans do not exceed 4,500. Fez is the principal city and the main seat of government, but Morocco and Mequinez are jointly capitals with Fez.

Anciently the country was a part of Mauritania. The Berbers were the earliest known inhabitants. It was annexed to the Roman Empire in 43 A. D., was conquered by the Vandals in 429, and in 533 became a dependency of the Eastern Empire. In the latter part of the 7th century Mauritania was conquered by the Arabs, and since 680 it has been largely in possession of that people and others of the Mohammedan faith. Edris ibn Abdallah, in 787, founded the kingdom of Fez and the city of Fez was begun in 807. In 1648 the present dynasty was founded, succeeding various independent monarchies that originated from a division resulting after securing independence from the caliphs of Bagdad. During the 18th century the Barbary influences maintained a widespread slavery of Christians, but that institution was abolished in 1814 and in 1817 piracy was forbidden. Abd-el-Kader conducted a war against France in 1844, and in 1859 a war occurred between Morocco and Spain, the latter terminating by a cession of land south of the Draha River.

In 1904 France and Great Britain concluded a treaty in which the former was given a free hand in Morocco, although it does not appear that Great Britain possessed any power to convey such authority. To this procedure Germany objected, making a formal protest in June, 1905, and for a time it was feared that war might be the outcome. The matter was referred to an international conference, which met at Algeciras, Spain, early in January, 1906, and of which the Duke of Almodovar, the Spanish minister of foreign affairs, was chosen president. Among the subjects considered by the conference were the creation of a state bank to facilitate financial reforms, the organization of the Moroccan police, and repression of contraband arms. Germany recognized a French protectorate in 1911, in consideration of which France ceded a part of French Congo to Germany. Berbers, Tuaregs, Arabs, Moors, Jews and Negroes are the chief inhabitants. Population, 1922, 7,280,000.

MOROCCO. See **Leather.**

MORPHEUS (môr'fūs), in Greek mythology, the son of Hypnus and the god of dreams. Homer describes the house of dreams as having two gates, one of ivory and the other of horn. From the former issue all deceptive and flattering visions, and through the latter proceed those dreams that are fulfilled. Morpheus is represented either as a youth or an old man with wings, bearing in one hand a cluster of poppies, in the attitude of scattering the seeds of that sleep-producing plant over the eyes of weary mortals as he moves with noiseless footsteps over the earth.

MORPHINE (môr'fĭn), or **Morphia,** a bitter alkaloid found in opium, first isolated by Sertürner, a chemist of Hanover, in 1816. It is a white crystalline substance and possesses strong narcotic properties. Although it is slightly soluble in water, especially in lime water, it may be dissolved readily in acids and in boiling alcohol. In combination with acid it forms crystallizable salts, which may be dissolved in water and alcohol. Morphine acts more quickly as a therapeutic agent than opium, since it is more readily absorbed by the system, hence is employed for hypodermic use and is a powerful emetic. However, the habitual use of this drug is very injurious, causing the victim to become pale, dyspeptic, and licentious.

MORPHOLOGY (môr-fŏl'ŏ-gy), the branch of biology which treats of the structure of animals and plants, describing the form of their organs and their various characteristics. It uses comparative anatomy and embryology, as a basis, hence lays the foundation for physiology, but has no reference to the uses or functions of the several parts. As a branch of science it is based largely upon embryology and comparative anatomy, requiring that the morphologist base both observation and comparison largely upon these branches.

MORRILL, Justin Smith, statesman, born in Strafford, Vt., April 14, 1810; died Dec. 28, 1898. He was educated in the common schools of Orange County and engaged in business, but later devoted himself to agricultural pursuits. In 1854 he was elected to Congress and was reëlected five times, where he served until 1867, when he was made a United States Senator, serving six terms successively. He was chairman of the Committee on Ways and Means a number of years and as such was the author of the Morrill tariff bill of 1861, which was among the first acts of Congress in support of high tariff legislation. The bill granting public land for the establishment and maintenance of State colleges to teach agriculture and mechanic arts was introduced by him. Though a

Republican and supporter of Lincoln, he opposed the issuance of a large volume of paper money and the annexation of Porto Rico, Hawaii, the Philippines, and other outlying territory.

MORRIS (mŏr'rĭs), **Clara,** actress, born in Toronto, Canada, in 1848. She was taken to Cleveland, Ohio, when an infant. In 1861 she became a member of a ballet and later a leading actress at the Academy of Music. She played successfully in Cincinnati, in 1869, and the following year was a member of Daly's company in New York City. Her leading rôles were in *Camille, Alixe,* and *Miss Multon.* In 1874 she married Frederick C. Harriott, and subsequent to 1885 devoted her time largely to writing books and contributing to magazines. Her literary products include "A Silent Singer," "A Pasteboard Crown," "Stage Confidences," "Little Jim Crow," and "The Two Orphans." She died Nov. 20, 1925.

MORRIS, Gouverneur, statesman, born in Morrisania, N. Y., Jan. 31, 1752; died Nov. 6, 1816. He graduated from Columbia College in 1768, was admitted to the bar in 1771, and in 1777 entered the Continental Congress, where he became a supporter of the Declaration of Independence and a leader in financial affairs. From 1781 to 1784 he served with Robert Morris as superintendent of the national finances, and in 1787 was a delegate to the convention that prepared the Constitution of the United States. In 1791 he was sent on a mission to England and served until 1794 as minister to France. He was a United States Senator from New York from 1800 to 1803, and from 1810 until his death served as a New York canal commissioner. Morris was a man of poetical genius, possessed marked eloquence as an orator, and manifested lofty feelings in private and public life. Jared Sparks published his life and correspondence.

MORRIS, Sir Lewis, poet, born in Caermarthen, Wales, Jan. 23, 1833; died Nov. 12, 1907. He attended Sherborne School and in 1855 graduated from Oxford. Three years later he was called to the bar, entered upon the practice of law, and in 1881 became secretary of the University College of Wales. His political influence was thrown in favor of Gladstone's Home Rule policy for Ireland. In 1880 he served on an important commission to inquire into the higher education of Wales. Three series of poems, entitled "Songs of Two Worlds," were his first productions, these appearing within the period of 1871 and 1875, and they have since gone through a large number of editions. His writings are of such value that Queen Victoria granted him a jubilee medal and in 1895 the honor of knighthood was conferred upon him. His later writings include "Epic of Hades," "The Ode of Life," "Songs of Britain," "Ode on the Queen's Jubilee," "Visions of Saints," and "Songs Without Notes."

MORRIS, Robert, financier and patriot, born in Lancashire, England, Jan. 20, 1734; died in Philadelphia, Pa., May 8, 1806. His parents brought him to America in 1747 and settled at Philadelphia, where he entered a countinghouse and later formed a business partnership. He was one of the early opponents of the Stamp Act, was elected a member of the Continental Congress in 1775, and there signed the Declaration of Independence. In 1777 he became identified with the management of the colonial finances, serving at first as an aid to the Committee of Ways and Means, and in 1781 was elected Superintendent of Finance. He established the Bank of North America in 1782, thus extending the credit of the colonies and placing the finances upon a creditable basis. In 1784 he retired, but later served in the Pennsylvania Legislature, was a delegate to the constitutional convention in 1787, and from 1789 to 1795 was a United States Senator. He was offered the office of Secretary of the Treasury while Senator, but declined. In the latter part of his life he became unsuccessful in business on account of speculation, and was at one time imprisoned for debt. Morris was able as a writer and influential as a public speaker.

MORRIS, William, poet and art worker, born at Walthamstow, near London, England, March 24, 1834; died Oct. 3, 1896. He was educated at Marlborough College and at Oxford, graduating at the latter institution in 1856. His college instruction included advanced training in architecture and painting, but soon after completing his course he devoted most of his time to literary work, though he was interested in manufacturing stained glass, wall papers, and art fabrics. In the manufacture of stained glass he was joined by Burne-Jones, Ford Madox Brown, and Dante G. Rossetti, and in conjunction with them contributed in reforming public taste for various designs and colors. His first volume of poems appeared in 1856 under the title of "Defense of Guinevere and Other Poems," a series of lyrics that have grown in popularity as they have been studied by readers of imaginative taste. The long narrative poem, "Life and Death of Jason," appeared in 1867 and constitutes a production that will perpetuate his name. Morris was not only a poetical writer of vigor, but established a wide reputation as a lecturer on sociology and allied economic subjects. His writings are characterized by a vivid imagination and beautiful gems of thought. Among his more recent productions are "Earthly Paradise," "Fall of the Niblungs," "Poems by the Way," and "Story of Sigurd of Volsung." His works in prose include "The Dream of John Ball," "Hopes and Fears for Art," and "News from Nowhere." He translated Homer's "Odyssey," Virgil's "Aeneid," and some of the Icelandic Sagas.

MORRISON (mŏr'rĭ-sŭn), **Robert,** noted missionary, born in Northumberland, England,

Jan. 5, 1782; died in Canton, China, Aug. 1, 1834. He secured a liberal education and, after engaging with the London Missionary Society, was sent to China in 1807. Some of the earliest Protestant missions in Eastern Asia were established under his direction. He distinguished himself by translating the Bible into the Chinese language, completing this laborious task in 1818. The production of a Chinese dictionary occupied his attention for a period of about fifteen years, which he completed in 1823. This work involved consulting fully 10,000 volumes of standard books in the Chinese. It was translated into Japanese and, though subsequently revised, still forms a standard work of reference of both the Japanese and Chinese. In 1824 he returned to England, where he was received with distinguished honors. He made a valuable addition to the University College in London by presenting that institution with his Chinese library. Soon after he returned to his field of operation in China, his death occurring while serving as interpreter to Lord Napier.

MORRISON, William Ralls, statesman, born in Monroe County, Illinois, Sept. 14, 1825. He graduated at McKendree College, served during the Mexican War as a private, and after the conclusion of peace devoted his attention to the law practice. He served three consecutive terms in the Illinois Legislature. When the Civil War began, he organized a regiment and was severely wounded at Fort Donelson. While still in the service he was elected as a Democrat to Congress in 1863. He served in Congress from 1873 to 1887, acting from 1873 to 1875 as chairman of the Ways and Means Committee. President Cleveland appointed him to the interstate commerce commission, in 1887, of which he served as a member for a long period of years. Morrison ranks as an advocate of tariff reform and was an able and forcible public speaker. He died Sept. 29, 1909.

MORRISTOWN, a city of New Jersey, county seat of Morris County, thirty miles west of New York City, on the Morristown and Erie, the Lackawanna, and other railroads. It is beautifully situated at an elevation of 500 feet above sea level, has electric railway communication, and is the home of many business men of New York. The surrounding country is fertile, producing large quantities of cereals, fruits, and dairy products. Among the manufactures are paper, machinery, wire, valves, bread, and wearing apparel. It has a fine courthouse, an orphans' home, and a State asylum for insane. The last named institution is one of the finest structures in the United States, costing about $2,650,000. Other features include the public library, the Y. M. C. A. building, the lyceum, and the Saint Elizabeth's Convent. The vicinity was first settled in 1710. Washington made Morristown the headquarters of the Continental army during a part of the Revolution. The Ford mansion occupied by him is still standing and is now the property of the State Historical Society. Population, 1920, 12,505.

MORSE, Edward Sylvester, naturalist, born in Portland, Me., June 18, 1838; died in 1925. He attended Bethel College and later completed a course at the Lawrence Scientific School, Cambridge. In 1871 he was made professor of comparative anatomy and zoölogy at Bowdoin College, remaining there until 1874, and from 1877 until 1880 he was professor of zoölogy at the Imperial University of Japan, Tokio, where he organized the Imperial Museum of Natural History. In Japan he made collections of valuable pottery, which he brought to America, and while there investigated the prehistorical archaeology of Japan. His collection of Japanese pottery was afterward installed as the Morse collection at the Museum of Fine Arts in Boston. His published works include "Systematic Position of Brachiopods," "Embryology of Terebratulina," "Ascending Process of the Astragalus in Birds," "On the Older Forms of Terra-Cotta Roofing Tiles," and "Japanese Homes and their Surroundings."

MORSE, Samuel Finley Breese, artist and inventor, born in Charlestown, Mass., April 27, 1791; died in New York City, April 2, 1872. In 1810 he graduated from Yale College, studied painting with Benjamin West in London, England, and in 1813 was awarded a gold medal by the Adelphi Society of Arts for his sculpture, "Dying Hercules." He returned to New York in 1815, where he was made president of the National Academy of Design, serving from 1826 to 1842. In 1835 he was elected professor of the arts of design in the University of New York, where he devoted much attention to chemistry, galvanism, and electricity. His first conception of a magnetic telegraph was formed in 1832. Three years later he was able to operate a line stretched in his room, representing nearly a mile of wire, and in 1837 made an exhibit of his invention to Congress.

SAMUEL F. B. MORSE.

In 1843, after much discussion, Congress finally appropriated $30,000 to establish a telegraph line between Washington and Baltimore, which was tested successfully in 1844, the election of James K. Polk as President being the first news of importance communicated from Washington. An effort to secure a patent in England and aid in America cost him all the means at his disposal, but, when his invention became practically applied, honors rarely equalled were bestowed upon him and much wealth resulted

from his efforts. In 1842 he tested successfully a submarine telegraph in New York harbor, and the following year suggested the feasibility of a Trans-Atlantic line of communication. His system of telegraphy became rapidly adopted in all the civilized countries, and in 1857 ten of the principal nations of Europe sent representatives to Paris, who voted him a gift of $80,000. At present telegraph lines are found in all countries of the world, and the inventions of Morse still constitute the principal apparatus, though the recording instrument has been succeeded quite generally by the sound system. Morse came in contact with Daguerre in Paris, and, after returning to the United States, he produced the first daguerreotype apparatus made in America.

MORTALITY (môr-tăl'ĭ-tỹ), **Statistics of,** the branch of study that investigates the growth and changes of population, frequently treated under the title of *vital statistics.* Information upon which the study of this subject is based is derived mainly from census and registration reports. While the census is taken only at certain periods, it is possible to compare the results of two or more enumerations. By registrations are meant the records made by certain officials, including mainly the statistical facts relating to births, deaths, marriages, and divorces. Statistical tables containing information in regard to the number of deaths at certain periods in life are known as tables of *mortality,* or tables of *vitality.* The death rate in Canada and the United States is practically the same, though in England it is somewhat lower. In 1900 the average age at death in the United States was 35.2 and in 1910 it was 36.3. The number of deaths per thousand in 1920 was 17.8. Following is a table showing the death rate of each sex per 100,000 persons in the United States for 1920:

DEATH RATE.

AGE.	MALES.	FEMALES.
0- 4	56.7	47.5
5-14	4.4	4.2
15-24	6.7	6.1
25-34	9.5	8.5
35-44	12.4	10.5
45-64	24.1	20.1
65-	91.1	82.6

MORTAR. See **Artillery.**

MORTAR. See **Cement.**

MORTGAGE (môr'gāj), a transfer or conveyance of property, either personal or real, as security for the payment of a debt or the performance of an obligation. Such a conveyance becomes void upon the payment or performance of the condition stipulated in the agreement. The creditor is called the *mortgagee* and the debtor is termed the *mortgagor.* The instrument is known as a *chattel mortgage,* when personal property, or chattels, are transferred, and as a *real estate mortgage,* when landed property is pledged as security. A mortgage, in order to be valid against a third party, must be placed on record in the county where the property is located. It does not convey absolute title even if full payment is not made, since in most instances the mortgagor has from six months to two years to redeem real estate, although in most cases the time of redemption is limited to one year. On the other hand, chattel property is sold on execution to the highest bidder to extinguish the debt and cannot be redeemed. However, in either case, any surplus remaining above the actual debt and the costs of the sale must be paid to the mortgagor.

MORTON (môr'tŭn), **Julius Sterling,** statesman, born in Adams, N. Y., April 22, 1832; died April 27, 1902. He descended from Scottish ancestry, graduated at Ann Arbor, and later took a course of law in New York City. After serving as a successful newspaper man in Detroit and Chicago, he settled at Bellevue, Neb., where he was elected to the territorial Legislature in 1855. In 1858 he was territorial secretary and soon after became acting Governor. President Cleveland appointed him Secretary of Agriculture in 1893. Morton is the originator of Arbor Day, a day celebrated in many of the states and some parts of Canada by appropriate exercises and tree planting, under which many regions of the country and school grounds have been improved by the planting and culture of shade and ornamental trees.

MORTON, Levi Parsons, statesman and financier, born in Shoreham, Vt., May 16, 1824. After receiving an education, he became a clerk in a mercantile establishment. Later he formed a partnership in a similar firm at Boston and afterward in New York City. In 1863 he founded a banking house in New York and soon after a like institution in London, two establishments that were fiscal agents of the United States from 1873 until 1884. He served in Congress as a Republican from 1878 to 1881 and became minister to France in the latter year, serving until 1885. In 1888 he was elected Vice President of the United States and in 1894 became Governor of New York. Morton holds a high rank among the orators and statesmen of the United States. During his active political life he exercised a far-reaching influence in public affairs. He died May 10, 1920.

MORTON, Oliver Perry, statesman, born in Wayne County, Indiana, Aug. 4, 1823; died Nov. 1, 1877. In 1838 he secured a position with a hatter. During his service he saved enough money to defray the expenses of attending Miami University four years and subsequently he took a law course at Centerville, entering upon the practice of law in 1847. In 1852 he became circuit judge, was an active organizer of the newly formed Republican party, and in 1860 was elected as Lieutenant Governor of the State. On the resignation of Gov. Henry S. Lane to serve in the United States Senate,

Morton became the Governor, an office he filled throughout the Civil War. His vigorous energy in supporting the Union by equipping and forwarding troops caused the Republican members of the Legislature to abandon that body, thus leaving their opponents without a quorum, but Morton continued to manage the State government without a Legislature. He borrowed the necessary funds to equip forces upon his own responsibility, but subsequently the State assumed the obligations that he incurred, and in 1864 he was reëlected Governor. He served from 1867 to 1877 in the United States Senate, where he became noted as an energetic worker, serving on important committees and strongly influencing the policy of his party. He ranks as an active advocate of the impeachment proceedings against President Johnson.

MORTON, Paul, public man, son of Julius Sterling Morton, born at Detroit, Mich., May 22, 1857. He removed with his father to Nebraska, where he entered the service of the Burlington Railway in 1872. At the beginning he was clerk in the land office of that company, but was successively promoted until he became general freight agent. Later he invested in coal mines and other enterprises. In 1898 he became second vice president of the Atchison, Topeka and Santa Fé Railway, serving until 1904, when President Roosevelt appointed him Secretary of the Navy. He resigned from the Cabinet in 1905 to become chairman of the board of directors of the Equitable Life Assurance Society of the United States. He died Jan. 19, 1911.

MORTON, William James, physician, born in Boston, Mass., in 1845. He was a son of W. T. G. Morton (1819-1868), a dentist and the introducer of sulphuric ether as an anaesthetic. In 1867 he graduated at Harvard University and later studied medicine in the United States and Austria. He went to Kimberley, South Africa, in 1874 to practice his profession and while there invested in diamond mining. Later he settled in New York City, where he became noted by introducing the X-Ray in medical practice. He devised a mechanism with which he produced a new variety of electrical currents much used at present in the treatment of diseases.

MOSAIC (mō-zā'ĭk), or **Mosaic Work,** the branch of fine art by which surface decorations are made by inlaying in patterns small pieces of variously colored stone, glass, or other material. The design may vary in the degree or kind of elaboration, from the simplest geometrical pattern to the most elaborate picture, including figure subjects represented in colors of countless gradations. As a branch of fine arts it is entitled to rank as a style of painting, since it requires the preparation of a cartoon or colored design, as in the case of a fresco or an elaborate, oiled picture, and the artist must be skilled in the science of form and composition. The mosaic is usually made upon a slab of stone, in which the workman cuts a certain space, which he encircles with dams or cramps of iron. Upon this hollowed surface mastic or cementing paste is gradually spread as the progress of the work may require, thus forming the adhesive ground or bed on which the mosaic is laid. Into this paste are stuck the colored stone, marble, or glass which compose the pictures. When the mastic or cementing paste is sufficiently hardened, the work is carefully polished, but the degree of polishing varies according to the distance at which the product is placed from the spectator. When the design is to be seen at a considerable distance, as in cupolas or flat ceilings, they are generally less elaborately polished than when the work is placed where it can be seen at short range.

Mosaic work originated in Egypt and was practiced by the Greeks after the time of Alexander the Great. Later it became prominent among the Romans, who used it as a favorite decoration of their floors and walls. Specimens of their work are found in many museums of Europe, including samples taken from the baths of Caracalla and the pavements of various Roman cities. These pavements were usually of a coarse design, while the mosaics found in the finer buildings are made up of pieces cut in various sizes, from the smallest pin point to an inch in length. Many of the mosaics include representations of flowers, plants, animals, and historical scenes.

MOSBY (mōz'bĭ), **John Singleton,** guerrilla soldier, born in Powhatan County, Virginia, Dec. 6, 1833. He studied at the University of Virginia, was admitted to the bar of that State, and in 1861 entered the Confederate service under Gen. Joseph E. Johnston. In 1862 he secured command as a scout of a force of volunteers with which he made devastating raids into the loyal states, many of which were notoriously disastrous to the Union cause, and for efficiency in that line was made colonel. At the suggestion of General Grant, Mosby and his forces were treated as belligerents, an act which he regarded with such a grateful spirit that he joined the Republican party. President Hayes appointed him as consul to Hong Kong, but he was removed by President Cleveland. He published "War Reminiscences" and a number of articles in periodicals. He died May 30, 1916.

MOSCOW (mŏs'kō), a city of Idaho, county seat of Latah County, ninety miles southeast of Spokane, Wash. It is located near the western boundary of the State, on the Northern Pacific Railway and the line of the Oregon Railroad and Navigation Company, and is surrounded by a farming and mining district. The manufactures include flour, lumber products, and brick and tile. It is the seat of the University of Idaho and the State Agricultural College. Electric lighting and waterworks are among the public utilities. Population, 1920, 3,956.

MOSCOW, the largest city of Russia, capital

of the Union of Soviet Republics, on the Moskva River, 402 miles southeast of Leningrad. The elevation above sea level is from 500 to 850 feet. Many of the streets are platted irregularly, but they are generally well graded and paved. A wall 26 miles in circuit surrounds a large part of the city, but several suburbs have been built beyond the inclosure. Near the center of the place is the citadel known as the Kremlin, which forms a formidable stronghold. The citadel has connected with it several palaces and other large buildings, including the historic palace of the czars, the Cathedral of Saint Michael, the Church of the Enunciation, the Cathedral of the Assumption, the tower of Ivan Veliki, and several other historical structures. All these buildings are richly ornamented with mosaics and fine decorations. The great tower is especially noteworthy, dating from 1600 and towering to a height of 270 feet. Within the Kremlin are about 800 cannon captured from Napoleon in 1812, a great decorative cannon, and a colossal bell weighing 200 tons. The latter was broken in an endeavor to place it in the tower. It has been said that Moscow is remarkable for two things, a cannon which has never been fired and a bell which has never been tolled.

On the outside of the Kremlin are likewise buildings of general interest, including the historical museum, the Cathedral of Saint Basil founded in 1554, and the Imperial University established by Empress Catharine in 1755. This university is attended by 4,800 students. It has advanced courses of study, fine supplies and apparatus, and a library of 200,000 volumes. An imperial library of 300,000 volumes is in the public museum, which has, in addition to the library, a valuable collection of work in the arts and sciences. The city has thoroughly organized public schools, an extensive system of electric street railways, public waterworks, electric lighting, stone and macadam pavements, and splendid boulevards, parks, and monuments. The manufactures include woolen, silk, and cotton goods, machinery, leather, furniture, spirituous liquors, metallic products, ironware, engines, paper, and earthenware. The commercial trade extends to all parts of Russia and bordering countries. Owing to its central location, it has a large trade in grain, merchandise, and live stock. It is not only on the commercial route between Saint Petersburg and the Black and Caspian seas, but is important because of its situation on the Trans-Siberian Railway.

The history of Moscow dates from the 12th century, having been founded in 1147 by Yuri Dolgoruki. At that time it was strongly fortified, but the Mongol incursions caused it to be sacked in 1237 and again in 1293. Later the Muscovite influences became more strongly established and it was made the capital of Muscovy. The Lithuanians made attacks upon it at various times in the 14th century, and in 1381 it was conquered by the Tartars. The Crimean Tartars again occupied it in 1591 and the Poles in 1610. Peter the Great removed the capital from Moscow to Saint Petersburg in 1713. In 1812 it was abandoned and burned by its own people to prevent its occupation by the French under Napoleon as winter headquarters. Subsequently the city has been improved until it takes rank as one of the most substantial and wealthy cities of Russia, being excelled in size by no other Russian city. Population, 1928, 2,118,640.

MOSELLE (mō-zĕl'), a river of Europe, an affluent of the Rhine. It rises in the Vosges Mountains of France, flows northwest to Nancy, and thence crosses into Germany and joins the Rhine at Coblenz. Its course is generally tortuous. The total length is 350 miles, of which about 200 miles are navigable. The valley of the Moselle is highly fertile and is noted for its production of aromatic and sparkling wines. Among the cities on its banks are Metz, Coblenz, Toul, and Treves.

MOSES, a famous lawgiver and prophet of the Israelites, born in Egypt, probably at Heliopolis, about 1600 B. C. His birth occurred at the time the Hebrew people were resident in Egypt, where they were oppressed under the laws of Pharaoh. He descended from the tribe of Levi, his father being Amram and his mother, Jochebed. An edict proclaimed by Pharaoh required that the Hebrew children of the male sex should be executed at birth and to save his life his mother placed him in a basket of bulrushes and hid him among the rushes of the Nile, where he was cared for by his sister, Miriam. When the king's daughter, Thermuthis, came to the river to bathe, she found the child in the basket, and, being impressed by his beauty, caused him to be taken to the king's palace and adopted as her son. His mother, Jochebed, was appointed as the nurse and he was educated in the princely rank for the priesthood. Moses was early imbued with the hope of Hebrew liberation and, when he slew an Egyptian while defending a fellow Hebrew, it became necessary for him to seek safety in the wilderness. For forty years he kept flocks of sheep on the pastoral lands, where he was promised by God that his race should be liberated and was imbued with power to perform miracles in order to prove his mission to the Egyptian authorities.

Moses was slow in speech, but in his effort for liberation he was joined by his elder brother, Aaron, who possessed considerable eloquence. At the age of eighty years he began to organize for the great exodus from Egypt. By exhibiting many miracles and causing Egypt, through the help of God, to be visited by ten destructive plagues, it became possible to induce Pharaoh to allow the departure of the Hebrews. The people and their effects were conducted safely across the Red Sea under the direction

of Moses, but when Pharaoh pursued them to require them to return both he and his army were drowned in the waters that swept over them. For forty years Moses conducted the pilgrimage in the wilderness. He exhibited rare ability in avoiding conflicts with hostile peoples, overcame jealousy among the different tribes, and by many miracles attested his divine mission.

The Ten Commandments were delivered by God while the Hebrews were encamped at Mount Sinai. Laws for the regulation of the domestic and religious life were established, and the people became enlightened by prophecies and instruction in government. At one time the distresses weighed so heavily upon him that he allowed a murmur to escape against his God, on account of which he was forbidden to enter the promised land. Moses then appointed Joshua as his successor, ascended Mount Nebo, from which he viewed the heritage of Israel, and on that mountain found an unknown grave. His life is naturally divided into three periods. The first forty years were devoted to his education and defense of the Hebrews in Egypt, the second forty years were spent in a pastoral life in the desert, and the last forty years were taken up by his wanderings with the Hebrews in the wilderness. A full account of the children of Israel is given in the Five Books of Moses.

MOSQUE (mŏsk), the name applied to a place of Mohammedan worship. The style of architecture employed in these structures is of Saracen origin. Three essential parts are common to all the more important mosques. These include the mihrab, the maksura, and the mimbar. The *mihrab* is a place of prayer that indicates the direction of Mecca, the *maksura* is a place for the preservation of the Koran, and the *mimbar* is a kind of pulpit. An open court, often covered with a dome, contains the fountain for ablutions. Another requirement is a form of tower called the *minaret,* which serves as a place from which the hour of prayer is announced by the Imam. Many of the larger mosques have from four to six minarets. Five prayers are said daily in the mosques. The worshiper removes his shoes on entering and carries them in his hand. After performing the necessary ablution, he takes his place in the mihrab, where the special prayers are offered and a sermon is delivered. Women rarely enter the mosque during the time of prayer, but a special place, set off by a screen, is provided for them in some buildings. The most noted mosques are the Mosque of Omar at Jerusalem, the Mosque of Tulun at Cairo, the Mosque of Walid at Damascus, the Masjid al-Haram at Mecca, and the Masjid al-Nabi at Medina.

MOSQUITO (mŏs-kē'tō), the common name applied to various two-winged insects, belonging to the gnat family. They have a long proboscis that serves to draw subsistence from animals and plants. The proboscis consists of six distinct slender pieces united at the base and protected by a sheathlike labium, capable of puncturing the skin of man and various animals to suck blood. However, the male of the mosquito feeds mostly on plant juices, while the female depends more largely on attacking the different classes of animals and man. Most of the species, of which there are several hundred, have long bodies and legs and, when flying, make a buzzing sound by a rapid motion of the wings. The female fastens the eggs, usually from 200 to 400, by means of a sticky substance to objects in stagnant water and the young are hatched in a few days. They are about half an inch long, when they are known as *wrigglers,* and, after remaining in the larva state about three weeks, pass into the pupa state. In this state they are smaller in size, take no nourishment, and soon after the fully developed mosquito is matured.

The family is divided into six subfamilies called *Anopheles, Aedomyia, Culex, Corethra, Megarhinus,* and *Trichoprosoön.* The *Corethra* does not belong to the biting mosquito, having a short proboscis not formed for piercing. The *Culex* is the typical genus and is found practically everywhere. In tropical countries the mosquitoes are of large size, but there are various species in the high latitudes, even in the polar circles. In some of the marshy regions great multitudes of mosquitoes are born in rapid succession and prove a noxious pest, while in temperate zones they appear most abundantly during the rainy seasons of the warmer parts of the year. Peoples advanced in civilized arts protect themselves by excluding the pests from dwellings by means of screens and nets, while savages use smoke as a preventive and in some cases cover the exposed portions of the body with an oil obnoxious to the insect.

The malaria mosquito, or *Anopheles,* has longer legs and a smaller body than the common species and its wings are characterized by small spots. The bite causes the deposit of a small animalcule or protozoan, which infests the red corpuscles of the blood and enlarges by growth until it occupies the whole corpuscle. Every three days it throws off a new brood of spores. The liberation in different broods takes place at the same time and produces paroxysms of fever and chills, and gradually the red corpuscles of the blood are infested and destroyed. Quinine is recommended as an effective remedy and should be taken when paroxysms begin to affect the patient.

The yellow fever mosquito, or *Stegomyia,* is found only in regions having a warm climate. It is distinguished from the common mosquito by silver stripes on the thorax and abdomen. At present the yellow fever germ is not clearly understood, but it has been quite definitely settled that yellow fever is not a contagion like smallpox, but that its spread is due to mosquitoes. This was demonstrated in Havana in

1900, where Dr. Sternberg, surgeon general of the United States army, undertook some notable experiments, and again in 1905, in the plague-infested centers of New Orleans. In the latter instance it was noticed that Italians who would not consult physicians and scattered among friends in the outlying districts of the city were taken down, but those in the same rooms remained immune to the disease so long as they were protected from bites of mosquitoes.

Prevention of mosquitoes has come to be an important study, and the movement has received much attention by authorities and public-spirited citizens. These insects being bred in stagnant pools of water, it has been recommended that their breeding places should be abolished. This means the hermetical sealing of cesspools, the removal of cans and bottles, the filling of hollows in old trees and stumps, the covering of rainwater barrels by screens, and the drainage of swamps. Recently the State geologist of New Jersey recommended that the swamps near Newark, about 27,000 acres, be drained and filled. Notable improvements were made in Havana, Cuba, by draining stagnant pools. A committee recommended the general use of screens in the homes, and that the skin be anointed with oil of citronella by those who are required to be in swampy regions at night. In 1904 Dr. W. C. Gorgas, assistant surgeon general of the United States army, gave instructions that all mosquito-breeding places in the Panama Canal Zone be drained, and there has been a notable improvement in that the cases of malaria and yellow fever have been reduced. Similar work is carried on by the Italian government in the black belt of Italy.

MOSQUITO TERRITORY, or **Mosquitia,** a region of Nicaragua, extending along the coast of the Caribbean Sea, formerly a kingdom under British protection. The coast regions are swampy, but the interior is mountainous and has a healthful climate. Stock raising, agriculture, and fishing are the principal industries. The region was discovered by Columbus in 1502 and claimed by Spain as dependent territory until 1660, when the British secured a protectorate, but they ceded it to Nicaragua in 1859, and in 1860 it was formally annexed by treaty to the Nicaraguan Republic. Since 1894 it has constituted the department of Velaya. Bluefields is the capital and chief town. Most of the inhabitants are Negroes and Indians. Population, 1922, 15,650.

MOSSES (mŏs'es), an extensive order of flowerless or cryptogamous plants, widely distributed in all regions, but most common in the regions of the Temperate zones where moisture is plentiful. Several thousand species are included in this order of plants, all of which are of small size, the largest rarely exceeding a foot in height. These plants are made up of a stem with distinct leaves and the roots grow out from the different portions of the plant. They are propagated either by spore cases that open by a terminal lid and contain spores unmixed with elaters, or by fusiform bodies containing minute roundish particles. Mosses propagate most abundantly in airy but cool and moist woods, where they appear upon the trunks of trees, on mountain sides, and on the roofs of houses. In high latitudes with a moist climate they flourish on the ground. Bogs are formed by mosses growing in moist places, those found at the surface at present being only a continuation of plant life that has existed many thousands of years, the older portions dying as the new spring into existence. They are of utility in protecting the roots of plants from cold and drought, while some forms supply valuable foods to animals, such as the reindeer, elk, and other species of high latitudes. The name is applied also to other cryptogamous plants, such as Iceland moss, and even to small matted flowering plants. However, the so-called Irish moss is a seaweed.

MOST, Johann Joseph, anarchist, born at Augsburg, Germany, in 1846; died March 17, 1906. He was apprentice to a bookbinder in his native city, but later traveled as an apprentice in Italy and Austria. Originally he was a socialist and, on returning to Germany, became editor of the *Freie Presse* in Berlin. In 1874 he represented Chemnitz in the national Reichstag, but was expelled from the socialist organization in 1878, when he went to London and founded the anarchistic periodical called *Die Freiheit.* He was imprisoned several times for inciting riots and in 1882 removed to New York, where he continued to publish the *Die Freiheit.* In 1901 he was arrested and imprisoned for publishing articles approving to some extent of the assassination of President McKinley. He published "Why I am a Communist," "Most's Songbook," and "Solution of the Social Question."

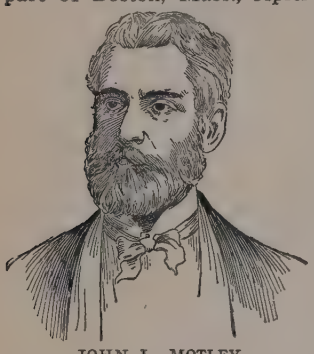
MOSZKOWSKI (mŏsh-kŏf'skē), **Moritz,** composer and pianist, born at Breslau, Germany, in 1854. He studied music at the conservatories of Berlin and Dresden and in 1873 made his début as a piano virtuoso at Berlin, which he made his residence. After 1897 he played successfully in the leading cities of France, England, and the United States. His work entitled "Spanish Dancers" was everywhere received with marked favor. He is the author of many pieces designed for the pianoforte and other instruments, including waltzes, operas, and symphonies. He died March 9, 1925.

MOTHS (mŏths), the name popularly applied to numerous lepidopterous insects. They are distinguished from butterflies in that the antennae taper to a point and do not terminate in a knob. Another marked difference is that they fly during the night or during twilight. They are less brightly colored than butterflies and when at rest fold their wings flat instead of erect, as do the butterflies. This class of in-

sects includes many species, ranging in size from forms so small as to be scarcely visible up to the *owl moth* of Brazil, which measures fully ten inches from wing to wing. To the moth family belong those insects that in a caterpillar stage feed on plants, fur, and clothes, such as the *carpenter moth* or *borer,* the *plume moth,* the *clothes moth,* the *hop-vine moth,* and the *wheat moth.* Some writers have designated a large number as *millers,* with which they include all the species whose bodies are covered by a dust or powder, like a miller's clothes. Others have confined the moth family to those that subsist on fur and cloth. The only species of utility to man are those known as *silk moths.*

MOTHER-OF-PEARL. See **Pearl.**

MOTLEY (mŏt'lĭ), **John Lothrop,** diplomatist and historian, born in Dorchester, now a part of Boston, Mass., April 15, 1814; died in Dorsetshire, England, May 19, 1877. He graduated at Harvard University in 1831, studied at the German universities of Göttingen and Berlin, and, after traveling in Europe, returned to America in 1834. Shortly after he was admitted to the bar, but soon engaged in literary work. His first writings included "Morton's Hope" and "Merry Mount," two novels that proved unsuccessful, and in 1846 he began the celebrated work that made him famous, entitled "The Rise of the Dutch Republic." This work was published after the labor of ten years had been devoted to the task, much of it in Germany and Holland. It was translated soon after into German, Dutch, French, Russian, and several other languages. Subsequently he developed this noted work into the "History of the United Netherlands," which appeared in four volumes, the last being published in 1868. While preparing his history he contributed extensively to the *Atlantic Monthly,* the *North American Review,* and the London *Times.* At the time the Civil War was in progress in America, he contributed to the last named publication for the purpose of giving the English people a correct view of the issues involved in the contest. President Lincoln appointed him United States minister to Vienna in 1861, in which position he served until 1867, and in 1869 became minister to England, but was recalled the following year. The last work published by Motley is the "Life and Death of John Barneveld." George William Curtis edited his correspondence and published it in two volumes. Among his writings are "Causes of the American Civil War" and "History of the Thirty Years' War."



JOHN L. MOTLEY.

MOTMOT (mŏt'mŏt), a genus of birds native to the warmer parts of North and South America, ranging from Mexico to Brazil. Fifteen species have been described, of which only one is seen as far north as the southern part of the United States. They live solitary or in pairs in the deep shades of the forests or gloomy recesses of old buildings, and usually perch with the head drawn between the shoulders. The plumage is very brilliant and the middle pair of feathers of the long tail have a peculiar shape and extend beyond the other tail feathers. The bill is rather long, slightly curved with compressed side. In size these birds resemble a blue jay, but the form is more slender. They move awkwardly on the ground, but fly quite rapidly.

MOTT, J. R., public man, born at Livingston Manor, N. Y., May 25, 1865. He studied at Yale and Princeton, engaged in missionary work and published many books relating to christian welfare. Throughout the war he was active as an official of the Young Men's Christian Association. In 1917 he accompanied Elihu Root on a mission to Russia.

MOTT, Lucretia Coffin, philanthropist, born in Nantucket, Mass., Jan. 3, 1793, died near Philadelphia, Pa., Nov. 11, 1880. She married John Mott, a Quaker abolitionist, in 1811, and in 1819 became a minister and advocate of the Quaker doctrine, displaying much eloquence in support of religious work. In 1833 she assisted in organizing the American Anti-Slavery Society at Philadelphia.

MOTT, Valentine, surgeon, born at Glen Cove, Long Island, Aug. 20, 1785; died April 26, 1865. He studied at Columbia College, New York, and later in London and Edinburgh. In 1809 he was made professor of surgery in Columbia College and subsequently held similar positions in a number of other institutions. He was prominent as a lecturer and writer and invented several useful surgical instruments.

MOULTON (mōl'tŭn), **Ellen Louisa,** poetess, born in Pomfret, Conn., April 10, 1835; died in Boston, Mass., Aug. 10, 1908. She attended the Willard Seminary, Troy, N. Y., and began early to devote attention to literary work. In 1853 she edited "Waverley Garland, a Present for All Seasons" and the following year published "This, That, and the Other." Her writings consist chiefly of stories for children, but they include many essays, poems, and novels. She married William Moulton, a publisher and journalist of Boston, in 1855. Among her best known works are "Bedtime Stories," "In the Garden of Dreams," "Stories Told by Twilight," "Ourselves and Our Neighbors," and "Swallow-Flight, and Other Stories."

MOULTRIE (mōl'trĭ), **William,** soldier, born in South Carolina in 1731; died Sept. 27, 1805. He entered the military service at an early age and in 1861 commanded a company

against the Cherokees. In 1775 he was appointed colonel of an American regiment in the Revolutionary War and undertook the defense of Charleston Harbor by building Fort Moultrie, a fortress on Sullivan's Island, where he repulsed the British under Sir Peter Parker, on Jan. 28, 1776. He defeated the British near Beaufort in 1779, while commanding the American forces in Georgia and South Carolina, but Charleston was captured the following year and he was forced to surrender. The British offered him a colonelcy in the British army, which he declined to accept, and he remained a prisoner for two years. After his exchange, in 1782, he was made major general, and subsequent to the war served several terms as Governor of South Carolina.

MOUND BIRD, the common name of a bird belonging to a group of fowls that build a mound for a nest, within which the eggs are hatched by the heat generated through the decay of vegetable matter used in constructing the mound. The mounds vary both in size and shape and are commonly used by the same birds from year to year, being increased in size from time to time by the addition of sand and vegetable matter. It is thought that the female assists the young to escape from the mound after being hatched, since they are strong and quite well feathered when they make their appearance. The eggs are from three to four inches long. In most cases the mounds are from a foot to ten feet above the ground. Birds of this class are found in Australia and New Guinea, where they are called *jungle fowl* and *brush turkeys* (q. v.). In size they vary from that of a fowl to a small turkey. The flesh is eaten.

MOUND BUILDERS, the name applied to a prehistoric race of North America, of which remarkable remains have been found in various portions of the continent, especially in the Mississippi valley, in the State of Washington, and in the peninsula of Yucatan. Knowledge of the existence of such remains was not attained until some time after permanent settlements were founded and trade with the Indians became established. Students of antiquity have ascribed the origin of the remains commonly found to a more or less civilized class of people who were the ancestors of the American Indians, though some writers think that they are the product of a race of people with superior intellect, but who were later exterminated by climatic conditions or by savage tribes. The remains consist mostly of extensive earthworks, and in many weapons and tools of stone and copper have been found. The methods of construction and many relics indicate that some of the earthworks were for defensive purposes and others for habitations. Others appear to have been used as temples and places of burial. About 200 mounds were excavated between 1844 and 1847 with the view of establishing at least some knowledge of the builders and their degree of civilization. Many excavations were made along the Des Moines River, in Iowa, in 1908 and specimens of the relics, mostly stone products, are preserved in the Iowa Historical Building at Des Moines. The results of these researches were published by the Smithsonian Institution and constitute the most authentic data at present available. It is learned from them that many of the mounds are from 100 feet to several miles in length and from five to 25 feet in height. Several of the larger mounds in the valley of the Ohio are from 60 to 100 feet high.

Many of the works attributed to the mound builders are in the form of rectangles. Some are square, others are circular or polygonal, and still others are in the form of different animals. One of the last named class was discovered in Adams County, Ohio, which had the form of a serpent, with a height of five feet and a length of 1,000 feet. At Newark, Ohio, is a group of mounds that consists of elaborate earthworks in the form of circles, octagons, and squares. It incloses an area of about four square miles. Many mounds have been discovered in the State of Washington, but in British America they are not numerous, and those found in Yucatan give evidence of remarkable age. Writers have divided the mounds into six classes, according to the purpose for which they were constructed, embracing sacred inclosures, sacrificial mounds, defensive mounds, sepulchral mounds, temples, and effigy mounds. The *sacred* inclosures are thought to contain the remains of deified objects. *Sacrificial* mounds give evidence that sacrifices were offered in the presence of fire on altars, *defensive* mounds seem to indicate fortifications by reason of underground passages, and *sepulchral* mounds were used for the burial of the dead. The *temples* contain relics which indicate certain forms of worship and religious rites. *Effigy* mounds were constructed in the form of animals, such as reptiles, mammals, tortoises, birds, and even man. The skeleton remains indicate that the dead were laid to rest side by side in rows, but the great antiquity of the mounds has made it impossible to find entire bones in a fair state of preservation, a fact that has led antiquarians to attribute the construction of the mounds to about the beginning of the Christian era.

Pottery of fine construction has been discovered in some of the mounds. They have been found to contain lamps, basins, tobacco pipes, rings, copper ornaments, arrow heads, needles of ivory, beads of mica, and copper tools. The remains of this character indicate that the mound builders were not only superior to the American Indians when the continent was discovered by Columbus, but also to the primitive peoples of Europe. The age of many of the mounds is attested by the presence of large trees growing on their sides and tops, and by the fact that none of the Indian traditions in

any way relates to the origin of the mounds. A mound found in the Little Miami valley gave evidence, when investigated, that fully 1,200 persons had been buried there, attesting the commonly supported view that the mound builders were numerous. The extent of their defensive embankments in various portions of West Virginia, Wisconsin, Iowa, Washington, and other regions is proof that their enemies were numerous and powerful.

MOUNDSVILLE, a city in West Virginia, county seat of Marshall County, on the Ohio River, ten miles south of Wheeling. It is on the Baltimore and Ohio Railroad and is surrounded by a farming country. The chief buildings include the county courthouse, the public high school, and the State penitentiary. Among the manufactures are glass, brick, boots and shoes, textiles, cigars, and clothing. Near it is a mound about 900 feet in circumference, dating from the mound builders. The place has waterworks, well-graded streets, and a large trade. Population, 1900, 5,362; in 1920, 10,669.

MOUNTAIN, an elevation of earth and rock, rising higher above the surface of the earth than a hill. Such an elevation is usually one of a chain, group, or system, but in some instances they occur singly. Mountains owe their origin to volcanic action, whereby certain regions became elevated and others depressed. However, some systems originated from subterranean movements extending over long periods of time and from the wearing away of a portion of the surface by the action of water. The various systems were formed at different times and their age is determined from the presence of rocks of known age. Mountains are important as they affect the climate, the higher elevations being subject to a lower temperature than regions nearer the level of the sea, thus modifying the temperature. They precipitate rainfall by bringing the moisture of the atmosphere to the dew point and constitute the principal sources of rivers. They are powerful factors in determining the location of towns and forests, contain a large part of the mineral wealth, and form the principal watersheds. The height of mountains is determined most accurately by surveying instruments in which trigonometry supplies the necessary formulae, but it may be calculated by observing the boiling point of water by means of the barometer. The highest mountain of Asia is Mount Everest, 29,002 feet; South America, Aconcagua, 23,910 feet; North America, McKinley, 20,464 feet; Africa, Kilimanjaro, 19,680 feet; Europe, Elbruz, 18,600 feet; Australia, Kosciusko, 7,308 feet.

MOUNTAIN ASH, or **Rowan Tree,** an ornamental tree native to the central part of North America and Europe, including a number of species. It has pinnate leaves, cream-white flowers, and scarlet berries with yellow flesh. The different species abound principally in mountainous districts, where they attain a height of from ten to thirty feet, and bear a wood of value for its compactness and durability.

MOUNT CARMEL, county seat of Wabash County, Ill., on the Wabash River and on the Southern and other railroads. It has railroad shops, flour and paper mills, strawboard factory, and machine shops. The chief buildings include the high school, public library and courthouse. It was settled in 1817 and incorporated in 1825. Population, 1920, 7,456.

MOUNT CARMEL (kär'měl), a borough of Northumberland County, Pennsylvania, 28 miles southeast of Sunbury, on the Pennsylvania and other railroads. The surrounding country is a productive anthracite coal region. It has a growing trade in merchandise. Population, 1910, 17,532; in 1920, 17,469.

MOUNT CLEMENS (klĕm'ẹnz), a city in Michigan, county seat of Macomb County, twenty miles northeast of Detroit, on the Clinton River and on the Grand Trunk Railroad. It is surrounded by a fertile agricultural country, has mineral springs of value for invalids, and is the center of a large trade. Among the buildings are a fine courthouse, the public library, and a number of schools and churches. It has manufactures of cigars, ironware, salt, beet sugar, furniture, machinery, and lumber products. The city has systems of waterworks and sanitary sewerage. It was settled in 1802 and incorporated in 1872. Population, 1920, 9,488.

MOUNT DESERT (dē-zẽrt'), an island lying one mile off the coast of Maine, belonging to Hancock County. It is about ten miles wide and fifteen miles long. The area is 100 square miles. The island has a mountainous surface and is noted as a fashionable resort. It contains several fine villages, extensive hotel facilities, and productive fisheries. The three principal harbors are at Northeast, Southwest, and Bar Harbor. Mount Desert was discovered by Champlain, by whom it was named, and the first settlement was made in 1608 by French Jesuits. The English founded the first permanent settlement at Somerville in 1789.

MOUNT HOLYOKE COLLEGE, an institution of learning near South Hadley, Mass., founded in 1837 by Mary Lyon for the higher education of women, to whom collegiate instruction had been refused except at Oberlin. Miss Lyon, a woman of great mental power, force of character, and executive ability, after several years of teaching, persuaded a number of able men to give their influence and aid as trustees, raised the necessary funds, and herself became the principal of this incorporated institution, which gave to young women opportunity for broad training and sound culture. Mount Holyoke was a seminary in name until 1888, when a college charter was granted. One-half the work of the four years is elective, chosen from courses offered by every department, including music and art, in which the practice courses are related to the historical. Mary E. Woolley is

president of the faculty, which numbers 85, with 14 assistants and 21 in the administrative force. The attendance is over 700 students, including a few graduate students, and many applicants are refused for lack of room.

The scholarship funds amount to $138,542, and four fellowships are awarded annually for study in some university. The system of coöperation inaugurated by Mary Lyon, through which each student had a share in the domestic work, is still retained, so that everyone who lives on the campus gives from twenty to fifty minutes a day either in the lighter housework or in laboratory, library, or office. The entire student body is organized into the Students' League for self-government. The college is undenominational, but distinctly Christian in its influence. Among the 9,000 women who have been students are many who are leaders in educational and religious work in all parts of the world. In 1925 the institution had three buildings of brownstone in late Gothic style, the chapel and administration building, the library and the art building, two buildings containing laboratories and lecture rooms, an observatory, a gymnasium, and other buildings on a campus of 150 acres. The library contains 86,000 volumes with a capacity of over 100,000 and provides for 380 readers. The value of the entire plant is estimated at $1,022,000 and the general endowment fund amounts to $801,000. Mount Holyoke receives the benefit of the Carnegie Foundation for the Advancement of Teaching.

MOUNT STERLING, a city of Kentucky, county seat of Montgomery County, 32 miles east of Lexington, on the Chesapeake and Ohio Railroad. The chief buildings include the public library, the high school, the courthouse, and a military school. It has manufactures of flour, gloves, canned goods, ice cream, bread, and utensils. Electric lighting, waterworks, and a system of public schools are among the utilities. Population, 1900, 3,561; in 1920, 3,995.

MOUNT VERNON, the home and burial place of George Washington, in Fairfax County, Virginia, on the Potomac River, about fifteen miles south of Washington. Several thousand acres of land were included in the original estate. Lawrence, the elder brother of George Washington, built the house in 1743 and named it in honor of Admiral Vernon, his commanding officer while serving in the West Indies, and later the estate passed to George Washington. The building is entirely of wood and is two stories and a half high. It is 30 feet wide by 96 feet long, has a high piazza on the east front, facing the Potomac, and near the back part are a number of outbuildings. The building was improved by George Washington and after his death came into possession of John A. Washington. In 1858 the Ladies' Mount Vernon Association purchased the house and 200 acres of land for the purpose of keeping it as a place of public interest. Washington's library and bedroom are still preserved in the form in which he used them. A short distance from the house, near a wooded ravine, is the tomb of Washington. The place is reached from Washington by steamboats and by an electric railway.

MOUNT VERNON, a city in Illinois, county seat of Jefferson County, 75 miles southeast of East Saint Louis. It is on the Wabash, the Southern, the Chicago and Alton, the Louisville and Nashville, and other railroads. Among the noteworthy buildings are the courthouse, the high school, and many churches. It has manufactures of flour, railway cars, stone products, clothing, machinery, and dairy products. Electric lights, waterworks, and telephones are among the improvements. Mount Vernon was settled in 1819 and incorporated in 1872. Population, 1900, 5,216; in 1920, 9,815.

MOUNT VERNON, a city of Indiana, county seat of Posey County, on the Ohio River, 18 miles west of Evansville. It is on the Louisville and Nashville and the Chicago and Eastern Illinois railroads. The principal buildings include the public library, the county courthouse, and the high school. It has manufactures of brick, ironware, flour, machinery, and utensils. Bituminous coal is mined in the vicinity. It has waterworks, sewerage, and a large trade in produce. The place was chartered as a city in 1853. Population, 1920, 5,284.

MOUNT VERNON, a city of New York, in Westchester County, on the Bronx River, fifteen miles north of New York City. It is on the New York, New Haven and Hartford and the New York Central railroads. Intercommunication is by a system of electric railways. The place is nicely located along the river and on an arm of Long Island Sound, many of the streets being paved with macadam and asphalt. The surrounding country is fertile, producing cereals, fruits, and live stock. Among the noteworthy buildings are the Carnegie public library, the Mount Vernon Hospital, the Lucas building, and the high school. It has manufactures of pens, jewelry, glue, and machinery. Many New York business men reside here. It has a considerable trade in merchandise. Population, 1905, 25,006; in 1925, 50,382.

MOUNT VERNON, a city in Ohio, county seat of Knox County, on the Kokosing River, 25 miles north of Newark. It is on the Baltimore and Ohio and other railroads. The manufactures include flour, wagons, machinery, engines, furniture, and tobacco products. Among the general facilities are waterworks and sanitary sewerage. The institutions include Mount Vernon Academy and Kenyon College, both of which are near the city. It has Hiawatha Park, a public library, and a fine courthouse. Natural gas is found in the vicinity. Population, 1900, 6,633; in 1920, 9,337.

MOUSE, the popular name of the smaller species of the genus *Mus,* the larger ones being known as rats. Mice are found in all parts of

the globe inhabited by man. In many tropical countries they are so abundant as to be extremely destructive in some seasons to the cereal crops, especially in various portions of Australia. The *common mouse* has a dusty-gray color above

FOREST MOUSE.

and is ashy colored beneath, and the tail is about as long as the body. In autumn it seeks food and shelter in houses and barns. The smallest quadruped known is the *harvest mouse,* which builds a small nest of grass about itself and hibernates during the winter. About 100 species of mice have been described. They include, besides those named above, the *forest mouse,* the *rice mouse* of the Southern States, the *deer mouse,* the *cotton mouse* found in cotton-producing countries, the *wood mouse,* the *field mouse,* and the *water mouse.* The names applied to these species indicate somewhat their habits and the places they frequent. Another American species, the *jumping mouse,* is closely allied to the *jerboa* (q. v.). The so-called *dormouse* (q. v.) does not belong to the true mouse family.

MOUTH, the first enlargement of the alimentary canal, bounded by the lips in front and the soft palate and arches behind. It is lined by mucous membrane and contains the tongue and teeth. When closed, the cavity is completely filled. Into it open the ducts from three pairs of salivary glands and much mucus is discharged upon its lining surfaces. The *isthmus of the fauces,* bounded by two muscular pillars, between which are the tonsils, connect it with the pharynx. The mouth is of great service in speech as well as in crushing food and mixing it with mucus and saliva.

MOVING PICTURES. See pages 1508, 1883.

MOWING MACHINE, an implement for cutting grass by horse power, in which the cutting apparatus is similar to that of the reaping machine. It is smaller and less complicated than the harvester, owing to the fact that it merely cuts the grass, which falls backward over the sickle bar. The working parts of most mowing machines are quite similar, though there are two general styles, known as the *front* and the *rear* cut. In the former, which is now in general use, the cutting apparatus is toward the front of the machine, making it less dangerous for the driver, who occupies a seat in the rear. See **Harvesting Machinery.**

MOYSE (mwäz), **Charles E.,** educator and author, born in England, March 9, 1852. He studied at Independent College, Taunton, and University College, London, and removed to Canada at an early age. In 1903 he was made dean of the faculty of arts and vice principal of McGill University, Toronto. For some years he was editor in chief of the *McGill University Magazine.* He published "Poetry as a Fine Art," "Dramatic Art of Shakespere," and "Shakespere Skull."

MOZAMBIQUE (mō-zạm-bēk′), or **Portuguese East Africa.** See **Portuguese East Africa.**

MOZAMBIQUE CHANNEL, an extensive strait between the continent of Africa and Madagascar. It has a width of 425 miles and a length of 1,030, and is noted for its important black whale fisheries. The Comoro Islands lie at the northern extremity of the channel. On its western shore is Mozambique, one of the chief trade centers of Portuguese East Africa.

MOZART (mō′zärt), **Johann Chrysostomus Wolfgang Amadeus,** noted musical composer, born in Salzburg, Germany, Jan. 27, 1756; died Dec. 4, 1791. His father was a director of the archiepiscopal chapel in his native town and gave the utmost care to the development of his musical talent. In 1762 he and his sister were taken to Munich and Vienna for training, where they received encouragement from the director of Bavaria and Emperor Francis I. The young musician began to compose symphonies at a very early age. When only fifteen years old, he was admitted as a member to the Philharmonic Society at Bologna, Italy, although the rule barred those under twenty from admission. While attending the Sistine Chapel, he became interested in several selections of Easter music, which he reproduced from memory after hearing them but once, and at the age of sixteen ranked with the leading musicians in the world.

JOHANN MOZART.

The court at Vienna selected Mozart as imperial composer in 1779, where he located immediately after, and at that city most of the noted musical productions upon which his fame

rests were composed. In 1780 he wrote his great composition, entitled "Idomeneo." Two years later he married Constance Weber, the daughter of the famous musician, and soon acquired a world-wide reputation. His fame spread throughout Germany, France, Italy, England, and other European countries, all giving him an enthusiastic reception in his tours devoted to concerts and musical teaching. The sale of his published works brought him a large profit. He was granted a handsome annual salary by the King of Prussia, and distinguished honors were conferred upon him in many of the leading countries. His death occurred shortly after finishing a requiem mass on which he had worked about a month.

It may be said of Mozart that no composer ever combined in equal proportions the perfection of learning and genius, and no one ever wrote with greater ease, finer dignity, and more profound scholarship. He excelled in every department of composing. When one contemplates the briefness of his life, it is indeed wonderful to note the large number and variety of his masterful productions. His entire list of different compositions numbers 624. Among them are thirteen symphonies, two cantatas, twenty-four pianoforte sonatas, four operas, and numerous hymns and offertories. His principal works embrace "Missere," "Mithridates," 'Clemency of Titus," "The Marriage of Figaro," "Magic Flute," "Seduction of the Serail," "Don Giovanni," and "Requiem." Several fine monuments have been erected to his honor, including one of much beauty at Vienna. His musical works are among the finest and most popular ever produced.

MUCILAGE (mū'sĭ-lăg), a solution of the gum of certain plants or some similar substance in water. A preparation of this kind made of gum arabic is much used as a paste. It is prepared by dissolving gum arabic in hot water and adding a small quantity of carbolic acid to check molding. Another form of mucilage is used in making pills and for the diffusion of insoluble substances in water.

MUCUS (mū'kŭs), the fluid which moistens the mucous membranes, by which it is secreted. It is a clear, viscid fluid, is slightly alkaline, and consists in great part of epithelial cells. Mucus is more or less mingled with all secretions poured upon mucous membranes, as the saliva, the biliary acids, and other digestive fluids. All the cavities of the body that have external openings are lined with membranes which are covered with mucus, including the nose, mouth, and intestinal canal. The purpose of mucus is to protect the membranes against the action of the food and the air, to keep them in a moist and flexible condition, and to lubricate the canals for the passage of various substances. Disease affects the mucus variously, rendering it acid or mixing it with pus.

MUDFISH, the common name of several species of fishes. They are found in fresh-water bodies, in the lakes and rivers between the Rocky Mountains and the Alleghenies, and in several sections of South America, Africa, and Australia. The American species belong properly to the ganoids. They attain a length of four feet and are favorites for food among the Indians. The mudfishes proper appear to form a connection between fishes and amphibians in that they are able to live for a brief period on land, breathing while out of water by taking in air, which is acted on by the swim bladder as a lung. While in water they breathe with the gills found in ordinary fishes. The ganoid, or mudfish, of North America frequently comes to the surface and breathes the air in a similar manner, though it more frequently remains under water for long periods of time. Mudfishes generally live on insect and animal food, though they likewise partake of various plants, especially the newer growths. Several species attain to a length of from three to six feet, have flat scales, and during a season of drought locate themselves in the mud, where they retain life in a more or less torpid state for a considerable period.

MUEZZIN (mû-ĕz'zĭn), or **Mueddin,** an officer of a mosque in Mohammedan countries, who calls the faithful to prayer at the five times in the day prescribed by the Koran, namely at dawn, noon, 4 P. M., sunset, and nightfall. The call to prayer is commonly made from the balcony of a minaret. As the minaret is elevated above the roofs and the interior of buildings, the muezzin is usually a blind man, since it is extremely distasteful to the jealous orientals to have any one see the proceedings in their private residences. It is currently reported that many feign to be blind in order to become muezzins to wealthy mosques.

MUGWUMP (mŭg'wŭmp), an Algonquin Indian word meaning *Great Man,* applied in American politics to a voter who claims the right to vote with another party than the one with which he is particularly identified. The term was thus used in 1872, when Horace Greeley, though a Republican, was the Liberal-Republican candidate for President. It came into general use in 1884, when many Republicans refused to vote for James G. Blaine for the Presidency, supporting Grover Cleveland, the Democratic nominee, for that office.

MÜHLENBERG (mü'lĕn-bĕrg), **Frederick Augustus Conrad,** clergyman and statesman, son of Heinrich Melchior Mühlenberg, born at Trappe, Pa., June 2, 1750; died June 4, 1801. He studied at the University of Halle, Germany, and in 1770 was ordained as pastor in the Lutheran church. In 1773 he received an important charge in New York City, where he remained until 1776, when he removed to Pennsylvania. He was an ardent supporter of the American cause, became a member of the Continental Congress in 1779, and took part in the

Pennsylvania assembly which ratified the Constitution. Subsequently he was elected to Congress and was several times reëlected, and was the first speaker of the House of Representatives of the United States. In 1795, while chairman of the committee of the whole, he cast the deciding vote in favor of the Jay Treaty.

MÜHLENBERG, Heinrich Melchior, German-American clergyman, born in Eimbeck, Germany, Sept. 6, 1711; died in Trappe, Pa., Oct. 7, 1787. He was educated at Göttingen and Halle, became a minister in 1739, and in 1741 came to Pennsylvania as a missionary. From 1742 to 1776 he devoted his entire time to the work of organizing the German Lutheran church in the colonies, and thereby acquired the distinction of being the founder of that faith in America. He was not only a devoted Christian, but an ardent patriot, and by his widespread influence did much to aid in the Revolutionary War. His son, John Peter Gabriel Mühlenberg, an American soldier, was born Oct. 1, 1746, at Trappe, Pa.; died Oct. 1, 1807. He was a pastor of the Lutheran church in Woodstock, Va. General Washington appointed him a colonel in the army and he preached his farewell sermon while he wore the uniform of that rank for the first time. Many of the members of his congregation joined his regiment. He rendered valuable service in the battles of Germantown and Brandywine, and by the close of the Revolution was made major general. From 1789 until 1795 he served in Congress and was again elected in 1799. His life-size statue occupies a place among those of other famous Americans in Statuary Hall of the Capitol at Washington, D. C.

MÜHLENBERG, William Augustus, clergyman and author, born in Philadelphia, Pa., Sept. 16, 1796; died in New York City April 8, 1877. He was a great-grandson of Heinrich Melchior Mühlenberg, graduated from the University of Pennsylvania in 1814, and in 1817 was ordained minister of the Protestant Episcopal Church. Soon after he became director of important parishes in Philadelphia. In 1846 he was selected to preach at the Church of the Holy Communion of New York. While serving at the last mentioned charge, in 1852, he organized the first Protestant Episcopal Sisterhood and founded Saint Luke's Hospital. Among his writings are "Church Poetry," "Family Prayers," "I Would Not Live Alway," "Music of the Church," and "Like Noah's Weary Dove."

MÜHLENBERG COLLEGE, an institution of learning at Allentown, Pa., under the control of the Evangelical Lutheran Church. It is a direct outgrowth of the Allentown Academy founded in 1848, but was not incorporated until 1867, when the first board of trustees for the college was elected. The institution was named in memory of Henry Melchior Mühlenberg, the patriarch of the Lutheran church in North America. It maintains classical and scientific courses, leading respectively to the degrees of A. B. and B. S., and supplies the needs of business men who want a course without the classical languages. The grounds consist of 72 acres, on which are located the administration building, the dormitory, the chemical laboratory, and other buildings. The value of the property is $1,400,956, the endowment is $775,981, and the library contains about 50,000 volumes. It has 1,400 graduates and has given instruction to over 5,500 students. With it is affiliated the department known as the Allentown Preparatory School.

MÜHLHAUSEN (mül-hou'zĕn), a city of Germany, in the province of Saxony, thirty miles northwest of Erfurt. It is located on the Unstrutt River and several railways and is surrounded by a fertile region. The chief buildings include a normal school for teachers, a gymnasium, a theater, and several public schools. It has manufactures of carpets, machinery, and woolen and linen goods. The trade is chiefly in grain, cattle, and fruit. Electric lighting, waterworks, and stone and asphalt paving are among the improvements. The city has been a part of Prussia since 1815. Population, 1905, 34,359; in 1920, 43,685.

MUIR (mūr), **John,** geologist and explorer, born in Dunbar, Scotland, April 21, 1838. He studied in the grammar school of his native city, emigrated to the United States, and subsequently graduated at the University of Wisconsin. Soon after he made explorations on the western coast of North America, particularly in Alaska, where he discovered the Muir Glacier, which is named in his honor. Later he visited the Arctic regions in search of the De Long expedition and, after returning to the United States, turned his attention largely to forestry. For several years he traveled in Siberia, India, and Australia. He published "Our National Parks" and "The Mountains of California." He died Dec. 24, 1914.

MUIR GLACIER, an extensive glacier of Alaska, at the head of Glacier Bay, about 100 miles northwest of Juneau. It is so named from its discoverer, John Muir. The length of this glacier is about 15 miles, having its source fully 1,000 feet above sea level, and varies in altitude from 80 to 210 feet. At its entrance into Glacier Bay it is nearly three miles wide, where great icebergs fall from overhanging cliffs into the sea. The area covered by the glacier is 350 square miles in extent, but the basin drained by it is probably equal to 800 square miles.

MUKDEN (mōōk-dĕn'), or **Moukden,** a city and the seat of government of Manchuria, situated 110 miles northeast of the Liao-tung Gulf. Formerly trade was carried chiefly from Niuchwang, its port, but since the completion of the Port Arthur-Harbin branch of the Trans-Siberian Railway it has increased greatly in commercial importance. A brick wall surrounds the city, which is regularly platted and solidly

built, and in the central part are the imperial palace and other public structures. The tombs of the present reigning family of China are near Mukden. It suffered greatly during the Boxer uprising in 1900 and was the seat of the great Battle of Mukden in 1905, in which 860,000 men were engaged. The Japanese under Marshal Oyama numbered 450,000 and General Kuropatkin commanded the Russian army of 410,000. The battle continued about two weeks, resulting in the defeat of the Russians with a loss of 100,000 men, while the Japanese lost about 75,000. The inhabitants consist mostly of Manchus, but include many Chinese and Japanese. Population, 1922, 178,450.

MULATTO (mū-lăt'tō). See **Negroes.**

MULBERRY (mŭl'bĕr-rў), a genus of trees native to tropical and temperate climates, cultivated on account of their fruit. The *common*

PAPER MULBERRY. BLACK MULBERRY.

or *black mulberry* is the only species that possesses fruit of considerable value. It is a native of Central Asia, whence it was brought to Europe more than ten centuries ago. The tree has many branches. It is low, the leaves are heart-shaped and very rough, and the bark is thick and uneven. This species thrives in America in regions south of 43° north latitude. Its fruit is eaten and is used in the manufacture of wine and preserves. The berries are of a purple-black color, yield a dark red juice, and are quite sweet to the taste. This class of mulberry trees grows vigorously for many years in suitable climates, many specimens in Europe being over 350 years old and still yielding an abundance of fruit. The leaves are regarded the most wholesome food for silkworms, on account of which the tree is cultivated extensively in various portions of Asia, Southern Europe, and the United States. Its bark yields a product useful in the manufacture of paper. The principal species of the mulberry in North America is the so-called *red mulberry,* which thrives abundantly in the central portion of the Mississippi valley, especially in southern Illinois, southern Iowa, Missouri, Kentucky, and adjacent states. Mulberry trees of this class grow to a height of from forty to sixty feet. They yield a durable wood. The fruit is fairly pleasant, but generally quite seedy. A distinct genus of trees bearing this name is the *paper mulberry,* which is native to Japan and the East Indies. It attains a height of from five to fifteen feet and is serviceable in the manufacture of clothing and paper. Its wood is useful in cabinet and ornamental work.

MULE, a name sometimes used loosely in lieu of the word *hybrid,* but it is applied more specially to the mule proper, the cross between a male ass with a mare, and to the *hinny,* the offspring of a she-ass and a stallion. The mule matures at a later period than the horse. It is of service for a longer period and as a beast of burden has some points of advantage not possessed by the horse. Among the advantages are that its skin is less sensitive, it is more easily fed, is less liable to disease, and is almost as surefooted as a goat. When treated kindly it is gentle and even in warfare is thought to possess advantages over the horse in some respects. The head of a mule is thin and long, the ears are prominent, the tail is bushy, the mane is short, and the hoof is quite small. It is a favorite animal in many of the Southern States and is employed extensively in the Spanish-American states, Southern Europe, Western Asia, and many parts of Africa. In size it usually represents the average between the sire and dam, weighing from 700 to 1,200 pounds.

MŬLHAUSEN (mül-hou'zĕn), a city of France, in Alsace-Lorraine, on the Ill and on the Rhine-Rhone Canal, 66 miles southwest of Strassburg. It is surrounded by a fertile region, is well connected by several important railroads, and has an active commercial trade. The manufactures include woolen and silk goods, clothing, carpets, leather, machinery, calico, chemicals, hardware, and musical instruments. It has a system of street railways, electric lighting, stone and macadam pavements, fine schools, and several hospitals and institutions of higher learning. Mülhausen dates from the early part of the 8th century. It became a free imperial city in 1273. During the Reformation it was an important center of Protestant influence. In 1798 it was annexed to France, but was returned to Germany in 1871. France acquired it as a result of the World War. Population, 1922, 97,679.

MULLEIN (mŭl'lĭn), a tall weed of the figwort family, having a stout stem covered with a dense woolly growth and bearing club-shaped

spikes of yellow flowers. Many species have been described, some of which yield medical properties of service in the treatment of coughs and colds. The most common species were brought to America from Europe, where, in some sections, they are obnoxious weeds. In early times the Greeks used the leaves in making wicks for lamps, while the Romans made torches by saturating the stalks with suet. It is at present most common in the older parts of Canada and the United States, but has spread quite generally in the populated regions of the central and western sections.

MÜLLER, Max. See **Max-Müller.**

MULLET (mŭl'lĕt), the popular name of a class of fishes. They include many well-known species and generally are divided into two groups, the *gray mullets* and the *red mullets.* The different species, about 75, are found abundantly along the coasts and in bays and seas. The species belonging to the red mullets are ground feeders, but are sometimes classed as *surmullets.* In the winter time they retire into deep water, but in summer approach the coast, and are most commonly observed in brakish water. They are brilliantly colored, attain a weight of ten or twelve pounds, and are considered good as food fish. The group of gray mullets is distributed quite generally in the Mediterranean, on the seacoasts of Europe, and in the warmer seas of America. The upper part is greenish in color, while the sides are more or less silvery. Several species of this group are cultivated extensively in countries adjacent to the Mediterranean, where they attain a weight of from ten to fifteen pounds and are considered favorites for food. The *striped mullet* is the best known species of America, occurring largely on the Atlantic coast south of New York and being especially abundant in the vicinity of the Bahama Islands. Large quantities are placed on the market early in autumn, at which season the mullet is esteemed especially for the table. Several species of surmullets present a peculiar appearance when the scales are rubbed off, as underneath them is a beautiful variety of bright red and purple tints.

MULOCK (mū'lŏk), **Dinah Maria.** See **Craik, Dinah Maria Mulock.**

MULREADY (mŭl'rĕd-ĭ), **William,** noted painter, born in Ennis, Ireland, April 1, 1786; died July 7, 1863. His parents took him to London in 1801, where he became a student at the Royal Academy. His first study was along the line of classic arts, but later he devoted himself to productions from nature, a line of work in which he developed his greatest ability and highest reputation. Among his paintings that illustrate scenes from common life are "The Idle Boys," "Barber's Shop," "Roadside Inn," and "Horses Bathing." Several excellent portraits were executed by him. He attained more than ordinary popularity by the production of illustrations for various books intended for juveniles, particularly for Goldsmith's "Vicar of Wakefield." In 1815 he became an associate of the Royal Academy and in the following year was made an academician.

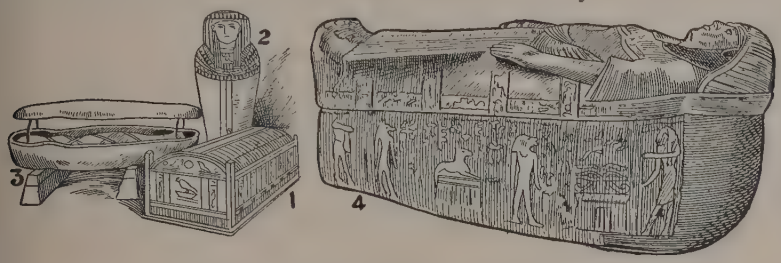
MUMMY (mŭm'mĭ), the embalmed and dried body of a human being. The term is applied to similarly preserved bodies of the so-called sacred animals of various peoples, as of the ibis, cat, crocodile, and ichneumon. Extensive researches have led to the belief that mummies were prepared by the ancients because they thought that the soul of the dead, who departed from this life in a justified state, in due course of time would become reunited with the body and enjoy an everlasting and visible existence. The time between death on earth and the period for taking on everlasting life was thought to cover a space of from 3,000 to 10,000 years, and in this period the intelligence existed as a luminous wanderer through space, while a probationary pilgrimage was performed by the soul in the mysterious underworld.

Some writers think that the preparation of mummies was influenced at least partially by a desire to guard against disease. The legendary story relating that the body of the god Osiris had been destroyed by Typhun, but that it was later discovered by Isis and embalmed under the direction of Anubis, is popularly thought the basis that caused mummification to be established as a religious rite. Many classes of mummies have been found in Egypt, the larger number consisting of human bodies, but there were included many specimens of sacred animals. It is thought that the practice dates from about 4000 B. C., many of the specimens indicating that early date as the probable time of the beginning of the art.

It is certain that the children of Israel learned the art of embalming in Egypt, since it is related that the bodies of Jacob and Joseph were treated in that manner and carried from Egypt. The art of mummification was highly developed among the Assyrians, Persians, Hebrews, Romans, and Peruvians, though these peoples were not able to prepare mummies that as successfully overcame the influences of time as those of the Egyptians. Many fine specimens of embalming at a remote period have been discovered in Peru and Mexico. The Guanchos of the Canary Islands developed skill in embalming almost as remarkable as that of the Egyptians. It is thought that the practice ceased in Egypt about the year 700 A. D. and that fully 750,000,000 bodies were embalmed while the practice prevailed in that country. Fine specimens have been found at various times, the most important of recent date being thirty embalmed bodies of distinguished personages, including the body of Rameses II., which was brought to light in 1881 at Deir-el-Bahari. The dryness of the air in some countries has a favorable influence upon mummification. In many localities the bodies of men and animals

have been found that were mummified as a natural consequence of climatic conditions.

Various methods have been employed by different peoples in the preparation of mummies. The method usually depended upon the state of civilization and the ability of surviving friends to defray the expense incurred. Among the poorer classes the bodies were dried by salt or natron, or left entirely covered with salt for seventy days, after which they were inclosed by wrappings of coarse cloth and placed in the catacombs. The most complicated operations were employed in embalming the bodies of the rich and distinguished. In the common method



MUMMY.
1, Coffin; 2, Mummy; 3. Inner Case; 4, Sarcophagus.

it was required that the entrails be removed through an opening in the side, though the heart and kidneys were left within the body, and the brain was taken out through the nostrils. The body was carefully shaved, washed, and soon after brought in contact with the necessary salts and spices, the process depending largely upon the ability to pay the expense. Powerful drugs were used in effecting passage into the various cavities of the skull and different portions of the body, while in some cases the nails were gilded and the toes and fingers were incased in costly inclosures of gold.

After all necessary rites and chemical treatments were completed, the bodies were carefully wrapped with bandages of linen. These bandages were extremely coarse for the poorer classes, while the finest India muslin was used for the wealthy. The strips were from two to four inches wide, and from 700 to 1,250 yards long. After the toes and fingers were carefully wrapped, the limbs were similarly inclosed, and finally a firm wrapping was made around the entire body, in many cases from fifteen to twenty thicknesses being utilized. The face was the object of especial care and was treated with a coat of fine plaster and various costly chemicals. It is thought that embalmers of cities often had from 500 to 800 corpses in their mortuaries, since it required considerable time to complete the entire process. The cost of high-class embalming was from $500 to $4,500 per corpse, depending entirely upon the value of the chemicals, perfume, and ornaments used. Usually the rich were provided with mummy cases, the more expensive consisting of three parts, the sarcophagus or coffin, the outer mummy case, and an inner case to contain the mummy. The outer case of the wealthy was prepared in a manner to show an outline of the person embalmed, and was richly decorated and painted with durable coloring with the view of constituting a fine representation of the individual. Embalming is now practiced by passing preservatives, such as corrosive sublimate, chloride of zinc, arsenic, and various oils, into the body. See **Embalming.**

MUMPS, a specific inflammation and swelling of the parotid and salivary glands. It is a contagious disease, sometimes epidemic, but generally is communicated by the saliva. The disease occurs principally in cold and damp weather of spring and autumn. It is most common among children and is more frequent in boys than girls. With good care it is unaccompanied by danger and seldom affects the same person twice, but when a relapse is taken from swelling and pain are communicated in females to the mammae, and in males to the testes. Careful attention and remaining indoors soon cause the inflammation to cease, but, if care is not taken, life may be endangered by transferring the inflammation to the brain.

MÜNCHHAUSEN (münk'hou-zen), **Karl Friedrich Hieronymus, Baron von,** eminent army officer, born in Hanover, Germany, May 11, 1720; died Feb. 22, 1797. He descended from an ancient and noble family, became a cavalry officer in the Russian army, and distinguished himself against the Turks in 1737-39. While engaged in these contests he displayed a passionate fondness for fine horses and hounds, and at various times made successful and adventurous tours to the different regions where wild game was abundant. During that time he displayed a remarkable imagination, which was so inventive that many extravagant stories were originated. These stories were compiled by Rudolf Erich Raspe, a literary genius who accompanied the baron. They were published in 1775 under the title, "Baron Münchhausen's Narrative of his Marvelous Travels and Campaigns in Russia." Later larger editions of the same work appeared, in which were published many additional anecdotes and wonderfully interesting accounts of adventures. Translations of these works were made into various languages. They are still popular. It is alleged that Münchhausen's imagination in the later part of his life was more responsive than his memory, and that he was led to believe many of the impossible and improbable productions of his mind. His name has become proverbial in many countries.

MUNCIE (mŭn'sĭ), a city in Indiana, coun-

ty seat of Delaware County, on the White River, 55 miles northeast of Indianapolis. It is on the Lake Erie and Western, the Chicago, Cincinnati and Louisville, the Cleveland, Cincinnati, Chicago and Saint Louis, and other railroads. Intercommunication is by electric railways and by a belt line that encircles the city. The noteworthy buildings include the courthouse, the public library, the high schools, the post office, and the Eastern Indiana Normal School. Among the manufactures are flour, glass, farming implements, machinery, cigars, and earthenware. In the surrounding country are productive deposits of natural gas and oil. The municipality maintains systems of paving, waterworks, and sanitary sewerage. It has a large trade in grain, stock, and various articles of manufacture. Population, 1900, 20,942; in 1920, 36,524.

MUNICH (mū'nĭk), a city of Germany, capital of the kingdom of Bavaria, on the Isar River, 295 miles south of Leipsic. It occupies a fine site on an extensive plateau, about 1,690 feet above sea level, is connected by a number of important railroads, and is one of the most progressive commercial and manufacturing centers of the German Empire. It has electric street railways, fine public promenades, botanic gardens, and a thoroughly organized system of public schools. The municipal facilities are entirely modern and the streets are wide and clean, but in the old part are a number of quaint buildings of irregular construction. King Ludwig I. devoted much care to the general improvement of the city, adorning it with a splendid royal palace and many municipal facilities. The noteworthy buildings include the Museum of Bavaria, the royal and national library, the municipal theater, the Ludwigskirche, the Basilica of Saint Boniface, the post office, the city hall, the art building, and the central railway station. Many fine paintings and sculptures are in the museum known as the Old and New Pinakothek. It has a large number of monuments representing various German statesmen, military heroes, reformers, and historic events. The public school system is maintained on a liberal and efficient basis. It has several colleges, academies, hospitals, and seminaries. The University of Munich, a noted institution of higher learning, was opened for instruction in 1472 and was incorporated with the city in 1826. It has a fine system of courses, 280 professors and teachers, 7,500 students, and a library of 825,000 volumes.

Munich has a foremost position as a commercial and an industrial center. The wholesaling and jobbing trade is very extensive. Large interests are vested in the enterprise of exporting merchandise, especially metal products and spirituous liquors. Among the manufactures are scientific instruments, jewelry, gold and silver lace, musical instruments, carriages, glass, spirituous liquors, cottons, woolen and silk goods, machinery, engines, and hardware. The city was named from the monks that owned its site. Its history extends back to 962, when it was founded by Henry, Duke of Saxony. In 1157 Henry the Lion made it the seat of a mint and salt exchange, and in the 13th century it was strongly fortified. Gustavus Adolphus conquered it in 1632. In 1800 Munich was subdued by the French under Moreau, and in 1805 it was taken by Napoleon. The population consists largely of Catholics, but includes many Protestants and Jews. The importance of Munich dates from the early part of the last century, when most of its larger manufacturing establishments were founded, and later its trade developed by the building of railroad connections. Population, 1905, 538,983; in 1920, 695,053.

MUNICIPAL GOVERNMENT, the administration of a minor civil division, such as a borough, village, town, or city. In most cases a municipality is chartered by the State or the Province, hence the legal designation differs somewhat, being confined to the terms town and city in most cases, which are usually divided into classes, as a city of the first or the second class, depending upon the population. The government of a municipality is subject to the general law of the State or Province in which it is located.

The three functions of general government are recognized in a municipality. Executive authority is vested in a mayor, who is the presiding officer of the common council, or board of aldermen. In the large cities the mayor is usually assisted by executive boards, which are responsible to the mayor and the council. The mayor has large appointive power in most cases, either appointing or nominating the policemen and other officers, and is usually the presiding officer of the police court. In some instances the council consists of two houses, known as the upper and the lower, but more frequently it is composed of a single body, the members of which, as well as the mayor, are chosen for a term of years by the people. Many cities are now governed by a commission of five or more members, one of whom discharges the functions of a mayor.

The government of a municipality is an important factor in the general affairs of the country. Among the functions are to control charities and corrections, to protect life and property, to promote public improvements, and to manage or supervise public utilities, such as lighting, sewerage, transportation, communication, and waterworks. The council has power to levy taxes, grant licenses, issue bonds under certain limitations, equalize assessments, and carry out the specific instructions of the electors. The larger development of manufacturing and other industries has tended to concentrate the population in the cities. This circumstance and the general growth of the larger municipalities within the last two decades have made the problem of municipal governments one of vast im-

portance in all the countries of America and Europe.

MUNICIPAL OWNERSHIP, the possession of public facilities by municipalities or any minor civil division of the state. In practice the term is used in describing public ownership as opposed to private ownership of all municipal facilities, such as lighting plants, waterworks, bath and lodging houses, street railways, and other industries promoted to supply the wants of the people in towns and cities. When used in this sense, the term implies operation as well as ownership by municipalities.

The problem of public control and ownership is not a new one, since cities as well as nations from remote antiquity have undertaken to construct and maintain improvements designed to promote industries of different kinds. This is exemplified in the construction of aqueducts to supply cities with water in the early periods of Rome. We have many instances in early history where revenues were derived by the public control and ownership of docks, improvement of harbors, and construction of bath houses. However, the services of this kind were anciently confined to larger cities, such as Alexandria, Athens, Rome, and Constantinople, and, on the other hand, the smaller towns were not supplied with facilities, or had only a few of minor importance under control of the municipalities. Much development in this line took place in the 19th century, both in Europe and America, and at the beginning of the 20th century there is a growing sentiment in favor of municipal control and ownership of public utilities.

The extent to which municipal governments should adopt the policy of public ownership is still a matter of wide discussion. On the one hand is a large element who favor the so-called *municipal socialism,* which would provide for all the wants of citizens so far as they can be met, including the management of bath houses, boarding houses, bakeries, and general supply stations. This phase is termed *municipal trading* in Great Britain, where many wants are supplied by municipalities that were formerly provided for by owners of private enterprises. In the United States and Canada municipal ownership extends principally to waterworks, sewerage, electric and gas lighting, telephones, ferries, street railways, and central heating plants. Those who favored the proposition that public facilities should be controlled by municipalities claim for their position that municipal ownership operates to render more efficient the service as well as to provide prolific sources to obtain revenue. In support of their view they cite public control of schools and government management of the postal system, both of which are referred to as more efficient under the present status than they could possibly be made if they were controlled by private ownership. In opposition to public ownership the argument is made that it restricts competition and tends to discourage development. Those who hold to this view call attention to the development of mining and to railroad building in America, which have enhanced enterprises and developed new regions and new industries. There is a growing sentiment in favor of controlling at least all services that are sanitary in character, such as sewerage and waterworks. In 1925 thirty out of a total of 38 cities in the United States with a population of 100,000 both controlled and owned their waterworks, and in the same year about 90 per cent. of the municipalities in Canada controlled their waterworks under municipal ownership.

The control and ownership of sewerage is almost exclusively in municipalities, both for drainage and household wastes. Out of a total of 1,524 places with a population of 3,000, in the United States, 1,096 are supplied with sewers and in only 47 instances the ownership is vested in private parties. On the other hand, municipal ownership of gas works is quite limited, there being only 21 municipal works in a total of 981 towns in the United States, and two of these supply natural gas. The first municipal electric lighting plant was established at Fairfield, Iowa, in 1882. Since then ownership by municipalities has increased rapidly, not only in the smaller places where private capital was not available, but also in the larger cities where private plants already existed. The official report for 1925 published by the Department of Commerce and Labor gave the total number of waterworks stations at 10,000, of which number 3,000 were private stations and 7,000 were municipal stations. A few of the municipal lighting plants, like those in Detroit and Chicago, are exclusively for lighting streets and public buildings, but a majority supply these wants and also furnish light to private consumers at a rate ranging a trifle above the cost of production and invariably lower than the charges made by private companies.

The question of municipal ownership has been made an issue in the elections of many cities. It has been before the voters of Chicago in several campaigns, particularly in 1904, when Edward F. Dunne (born in 1853), who may be regarded a representative advocate of the doctrine that public facilities should be owned and controlled by the municipality, was elected mayor on a platform favorable to the immediate municipal ownership of street railways and other public facilities. In 1905 William R. Hearst was a candidate for mayor of New York City on a ticket pledged to municipal ownership and claimed the election, but his claims were set aside by the board that

EDWARD F. DUNNE.

heard the contest and George B. McClellan, the Democratic nominee, was seated. Recent city elections indicate that this issue and the matter of making municipal elections nonpartisan are two prominent movements in America. The United Cities Conference, in session in Chicago in January, 1920, in which sixteen leading cities were represented, made the following recommendations favorable to the elimination of party politics from municipal elections:

1. That cities should be granted the largest possible measure of home rule, subject only to such general statutory safeguards and restrictions as may be necessary to protect the general interests of the state as distinguished from the local interests of the municipality.

2. That the party column on the ballot should be abolished, that the names of candidates for a single office should be printed on the ballot under the designation of that office, and that it should be made impossible to vote a straight party ticket by a single mark or cross.

3. That municipal nominations and elections should be completely separated from state and national nominations and elections, and should occur at different times, and that nominations for all municipal offices be made by petition or by an efficient method of direct primaries.

4. That the number of elective municipal officers should be reduced as far as practicable, always preserving the right to elect members of the municipal legislative body or city council.

5. That the merit principle should be applied to all departments of city administration under practical and efficient civil service laws.

MUNKÁCSY (mōōn'kä-chē), **Mihály,** noted painter whose German name was Michael Lieb, born in Munkács, Hungary, Oct. 10, 1844; died May 1, 1900. He studied at Vienna and Düsseldorf, and in the latter city produced various splendid works of art. In 1872 he located in Paris, where he devoted himself largely to the production of genre pictures, among them a number illustrating Hungarian life. He produced many paintings depicting the life of society in Paris and several famous historical paintings. The most noted of his productions include "The Last Day of a Man Condemned to Death," "Christ Before Pilate," "Village Hero in Hungary," "Christ on Calvary," "Interior of a Studio," "Mozart's Last Moments," and "Night Prowlers."

MUNROE (mŭn-rō'), **Kirk,** author, born near Prairie du Chien, Wis., Sept. 15, 1850. He studied in the public schools at Appleton, Wis., and later took a course in civil engineering at Harvard University. While engaged as a railway engineer on the Northern and Southern Pacific railroads, he gathered material for his numerous tales. In 1879 he became editor of *Harper's Young People,* but after 1882 he resided chiefly in the southern part of Florida. His books are mainly for young people. They include "The Painted Desert," "Through Swamp and Glade," "Under the Great Bear," "At War With Pontiac," "The Belt of Seven Totems," "The Flamingo Feather," and "Dory Mates."

MUNSEE, a tribe of the Delaware Indians, formerly occupying the region along the Delaware River. They were warlike and wise in the councils of their tribe. In 1740 they removed from the Delaware and settled on the Susquehanna, and later became widely scattered in Canada and the United States. A small number of these Indians now reside in Ontario, Canada, and others are resident in Kansas and Wisconsin. Many of these Indians have given up tribal relations and are well advanced in educational arts.

MÜNSTER (mün'stĕr), a city of Germany, capital of the province of Westphalia, at the confluence of the Aa River with the Münster Canal, 76 miles northeast of Cologne. It is connected with other cities by a number of railroads, has well-improved streets, and electric lights and street railways. Münster is noted for its fine churches and educational institutions. It has several large canning and meat-packing establishments. The city dates from the time of Charles the Great. In 1535 it was the scene of disturbances by the Anabaptists. It was besieged a number of times in the Seven Years' War. The government was secularized in 1803, and soon after it passed into possession of France, but since the fall of Napoleon it has been a part of the German Empire. Population, 1905, 81,468; in 1920, 90,283.

MUNSTERBERG, Hugo, professor of psychology, born at Danzig, Germany, June 1, 1863. In 1882 he graduated at the gymnasium in his native city, studied at Leipzig and Heidelberg, and later became instructor in the University of Freiburg. He was made professor of psychology at Harvard University, in 1892, where he directed the organization of the psychological laboratory. He wrote "Psychology and Life," "The Americans," "Eternal Life," "People of Art Education," and other well known publications.

MURADABAD (mōō-rŭd-à-bäd'), or **Moradabad,** a city of British India, capital of a district of the same name, fifty miles northwest of Bareilly. It is located on the Ramganga River, has railroad facilities, and is surrounded by a fertile region. The chief buildings include two mosques, several government houses, and an American Methodist mission church. The manufactures include cotton goods, clothing, and metal ware. It has electric lighting, waterworks, and a telephone system. The place was founded in 1625 by Rustam Khan. Population, 1922, 76,382.

MURAT (mü-rà'), **Joachim,** King of Naples, born near Cahors, France, March 25, 1771; executed at Pizzo, Italy, Oct. 13, 1815. He was the youngest son of an innkeeper, secured elementary training for the priesthood, but at the beginning of the Revolution entered the army of France. In 1791 he became attached to Napo-

leon, served with that commander in Italy and Egypt, and in 1799 attained to the rank of general. He married Caroline, youngest sister of Napoleon, in 1800, and soon after received command of the consular guard. At the Battle of Marengo he distinguished himself as chief commander of cavalry, was made governor of the Cisalpine Republic in 1801, and in 1804 became marshal of the empire and prince of the imperial house. He had command of the cavalry in the Russian War of 1806 and in the Russian War of 1807, and in 1808 became king of the Two Sicilies with the title of Joachim Napoleon. His government was efficient and popular.

In 1812 Murat joined the forces of Napoleon in the Russian campaign, whom he likewise aided the following year, but after the Battle of Leipsic concluded a peace treaty with Austria. When Napoleon began his return from Elba, Murat became engaged in a war against Austria, and on May 2, 1815, he was defeated at Tolentino by Generals Bianchi and Neipperg. Murat effected a safe retreat with a few cavalrymen to Naples, but was required by an insurrection to seek safety in France. He escaped to Corsica at the overthrow of Napoleon and attempted to recover his kingdom of Naples by an invasion, but was captured on Oct. 8, 1815, while landing at Pizzo. Shortly after he was tried by court-martial and soon after was shot. Murat had two sons, Achille Napoleon and Lucien Charles Napoleon. The former married a niece of Washington and resided for some time in Florida, while the latter served as a senator in France and under Napoleon III. became an ambassador.

MURCHISON (mûr'kĭ-sŭn), **Sir Roderick Impey,** geologist and geographer, born in Tarradale, Scotland, Feb. 19, 1792; died Oct. 22, 1871. He studied at the Durham Grammar School and the Marlow Military College, and at an early age entered the military service. An official position was given him in a regiment that served in Spain and Portugal, but in 1816 he left the army to make an extended tour to various portions of the world for the purpose of investigating the geology of different regions. His geological researches extended to different parts of Norway, Sweden, Russia, Germany, and America, and in 1840 he was appointed by the imperial government of Russia to begin a geological survey of the empire, a work that he completed after five years. In 1844 he gave an address in which he pointed out the similarity between the geological structure of the Ural Mountains and the highlands of Australia, and was the first to predict that rich deposits of gold would be found in the regions of the latter. The efforts put forth by him induced many individuals and companies to engage in explorations and expeditions of discovery, not only in Australia, but in Africa and regions of the Arctic. Many societies of high repute honored him with membership and official positions. In 1846 he was knighted. He was made a baronet in 1863, and in 1865 was elected director of the museum of practical geology. Among his principal writings are "Geology of Russia in Europe and the Ural Mountains," "Tertiary Deposits of Lower Styria," and "Silurian System."

MURCIA (mûr'shĭ-ȧ), a city of Spain, capital of a province of the same name, on the Segura River, thirty miles northwest of Cartagena. It is surrounded by a rich and productive region, is well watered, and contains direct railroad connection with the Mediterranean Sea. The streets are clean but narrow, the houses are gaudily painted, and it has a number of modern facilities. Splendid gardens of orange, fig, mulberry, and palm trees surround the city. The principal buildings include the bishop's palace and the cathedral, the latter being a fine representative of Corinthian and Composite architecture. It was founded in 1353. Among the manufactures are linens, silk and woolen goods, carpets, oil, leather, cordage, baskets, ironware, glass, gunpowder, machinery, and musical instruments. Murcia was formerly the capital of the ancient kingdom of Murcia. For many years it was in the possession of the Moors. In 1263 it was conquered by Alfonso X. The city has an important trade in merchandise. Population, 1920, 124,985.

MURDER, the act of killing a human being with premeditated malice. It is criminal in case the person committing the act is sound in mind and discretion, but if the act is justifiable or excusable no penalty attaches under the law. Criminal homicide is classed as murder in the *first degree,* murder in the *second degree,* or *manslaughter.* In some countries manslaughter is termed either as *involuntary* or as *voluntary,* the former being due to accident and the latter to malice aforethought. The penalty for murder in the first degree is usually death or life imprisonment, while murder in the second degree and manslaughter are punished by imprisonment for a term of years, depending upon the circumstances under which the act was committed.

MURDOCK (mûr'dŏk), **James Edward,** actor, born in Philadelphia, Pa., Jan. 25, 1811; died there May 19, 1893. After attending school and securing training as an actor, he appeared successfully at Philadelphia, and in 1838 played with Ellen Terry in New York and other cities. In 1842 he engaged as a Shakespearean lecturer and teacher of elocution, but later played successfully in "Hamlet" and other Shakespearean plays at many of the principal cities of the United States, Canada, and England. At the time of the Civil War he rendered efficient service by collecting funds for the sanitary commission and personally appeared upon the battlefields to administer to the wants of the wounded and sick. He joined William Russell in publishing "Orthophony, or Culture of the Voice."

MURDOCK, William, inventor, born near

Auchinleck, Scotland, Aug. 25, 1754; died in 1839. He was the son of a millwright, who taught him the arts of a miller, and until 1777 worked in the mill of his father. At that time he engaged at Birmingham, England, in an engineering establishment, and soon after received an appointment to superintend the erection and fitting of structures at the Cornish mines. He built a high-pressure engine to run on wheels in 1784, a structure from which the modern steam locomotive was patterned in at least some respects, and later invented an oscillating engine. Among his inventions is a steam gun, an apparatus to heat large buildings by hot water, and machinery for the purpose of utilizing gas in producing light. The last named invention was his most important achievement, which included devices by which the distillation of coal gas became possible. Gas was not only successfully produced by these means, but he applied it in lighting large buildings and propelling machinery. It is singular that Murdock never gained much profit from his great invention, a circumstance due largely to his neglect in having it patented.

MURFREE (mûr'frē), **Mary Noailles,** novelist, best known by the pseudonym Charles Egbert Craddock, born in Murfreesboro, Tenn., Jan. 24, 1850. Her father's fortune was destroyed almost entirely by the Civil War, and he soon after went with his family to Saint Louis, Mo. There he wrote for several reviews and magazines, while the daughter engaged in writing stories of mountain life in Tennessee. Her first story was "The Dancin' Party" and this with several others appeared in the *Atlantic Monthly.* "Where the Battle Was Fought" is a splendid story of the birthplace of the author, being founded on the fact that the house in which she was born was destroyed by shot and shell in the Battle of Stone River. Miss Murfree produced many excellent writings, all of which show that she wrote with zealous industry and combined with it splendid natural gifts. Her pseudonym is from the hero of the "Dancin' Party," *Egbert Craddock,* to which she prefixed *Charles.* Her productions, aside from those named above, include "In the Stranger People's Country," "In the Mountains of Tennessee," "His Vanished Star," "Prophet of the Great Smoky Mountains," "Down the Ravine," "Mystery of Witchface Mountain," and "A Spectre of Power." She died July 31, 1922.

MURFREESBORO (mûr'frēs-bŭr-ō), a city of Tennessee, county seat of Rutherford County, 31 miles southeast of Nashville, on the Nashville, Chattaooga and Saint Louis Railroad. The principal buildings include the county courthouse, the Mooney School, and the Soule Female College. It has manufactures of leather, flour, tobacco, utensils, and machinery. The place was first settled in 1811 and incorporated in 1817. From 1819 until 1825 it was the capital of the State. It was the scene of several engagements in the Civil War, the most important one being known as the Battle of Murfreesboro, which occurred Dec. 31, 1862, and Jan. 1 and 2, 1863. The Federals were commanded by General Rosecrans, whose army consisted of 43,000 men, and the Confederates, numbering 62,000 men, were under command of General Bragg. The Confederates were concentrated near Murfreesboro, on the Stone River, while General Rosecrans advanced from Nashville to surprise the enemy. In the contest of three days the Confederates were forced to retire. The Union side lost 13,000 men and the Confederate lost 10,000. A fine national cemetery with 6,150 graves is near the city. Population, 1900, 3,999; in 1920, 5,367.

MURILLO (mû-rĭl'lō), **Bartolomé Estéban,** noted painter, born in Seville, Spain, Dec. 22, 1617; died April 3, 1682. He received only an elementary education and was placed by his parents in the care of his relative, Juan del Castillo, to study painting. His first work that brought him returns consisted of paintings of a religious character, which were exported to South America. At the age of 24 years he went to Madrid, where he met Velásquez, who was then the painter to the king. Through his influence Murillo was permitted to study the royal collections of Italian and Flemish masters and to copy in the royal gallery. In 1645 he settled permanently at Seville, where he soon established his reputation as one of the most eminent Spanish masters. In 1648 he married a lady who possessed considerable wealth. Combining the fortune of his wife with his own personal influence, his home became noted as a center of fashion, and in 1660 he established an academy of arts at Seville.

Murillo is noted for the efficient manner in which he treated religious subjects, combining splendid idealism with realism, and giving to all parts of his productions excellent coloring. It is held by critics that his ability to paint with accuracy the shades and tints of human flesh has never been equaled. Besides painting a large number of religious and scriptural works, he produced many beautiful representations of natural scenery, such as street views, paintings of children, and group work. His celebrated "The Immaculate Conception" is one of his best known works. It sold in 1852 for $120,000 and is now in the Louvre at Paris. Other paintings of note are "The Flight into Egypt," "Moses Striking the Rock," "Return of the Prodigal," "Miracle of the Loaves and Fishes," "Abraham Receiving the Three Angels," "Peter Released from Prison," "Saint Elizabeth of Hungary," "Peter Weeping," and "Blessed Virgin."

MURPHYSBORO (mûr'fĭz-bŭr-ō), a city in Illinois, county seat of Jackson County, on the Big Muddy River, fifty miles north of Cairo. It is on the Illinois Central, the Missouri Pacific, and the Mobile and Ohio railroads. The surrounding country is fertile and

has deposits of coal and building stone. Among the manufactures are flour, cigars, earthenware, brick, and clothing. Electric lights, waterworks, the high school, and the county courthouse are among the noteworthy features. It has a large trade in farm produce. Population, 1900, 6,463; in 1920, 10,703.

MURPHY, John B., surgeon, born at Appleton, Wis., Dec. 21, 1857; died Aug. 11, 1916. He studied at Rush Medical College and in Germany. In 1885 he was made professor of surgeons in Northwestern University. He became distinguished both as a surgeon in hospitals and as an inventor of appliances and instruments useful in surgery.

MURRAY (mŭr'rĭ), the principal river of Australia. It rises in the Australian Alps, near the boundary between Victoria and New South Wales, and flows in a general course toward the northwest nearly to the boundary line of South Australia. Thence it has a course toward the west and south until it flows into Encounter Bay, through Lake Alexandria. The total length of the river is 1,125 miles, the basin includes 270,000 square miles, and it is navigable for a distance of about 175 miles, though large steamers are prevented from entering the stream because of sand bars at its mouth. It overflows the lower valley periodically, causing a large scope of country to become enriched by the inundations. Its principal tributaries include the Darling and Murrumbidgee. Through the latter it receives the waters from the Lachlan.

MURRAY, David Christie, novelist, born in West Bromwich, England, April 13, 1847. He was educated in a private school, and became war correspondent for the London *Times* in the Russo-Turkish War. His first novel was completed in 1879, entitled "A Life of Atonement," which was published in *Chamber's Journal.* Many of his writings have been dramatized. He lectured extensively in Canada, Australia, and the United States. His books include "A Race for Millions," "A Rising Star," "The Way of the World," "In Direst Peril," "The Weaker Vessel," "Making a Novelist," and "A Rogue's Conscience." He died in 1907.

MURRAY, James Ormsby, author and educator, born in Camden, S. C., Nov. 27, 1827; died in Princeton, N. J., March 27, 1899. In 1850 he graduated from Brown College, taught Greek there for one year, and in 1861 became a Congregational clergyman in Peabody, Mass. He published "Life of Francis Wayland," "Introduction to Cowper's Poetical Works," "Religion in Literature," and "Lectures on English Literature."

MURRAY, John Clark, educator, born at Paisley, Scotland, March 19, 1836; died in 1917. He studied in Edinburgh and later at Heidelberg and Göttingen, Germany. In 1862 he became professor of philosophy in Queen's University, Kingston, Ontario, serving there until 1872, when he was made professor of moral philosophy in McGill University, Montreal. His books include "Handbook of Psychology," "The Ballads and Songs of Scotland," "An Introduction to Ethics," and "An Introduction to Psychology." He translated from the German "Solomon Maimon, an Autobiography."

MURRAY, Lindley, grammarian and author, born in Swatara, Pa., April 22, 1745; died Feb. 16, 1826. He settled at Holdgate, England, in 1784. He published "The Power of Religion on the Mind," in 1787. In 1795 he completed his "Grammar of the English Language." This grammar was a standard in America and England for half a century.

MURRUMBIDGEE (mŭr-ŭm-bĭd'jē), a river of Australia, rises in the Blue Mountains and flows into the Murray. The length is 1,350 miles, of which about 500 miles are navigable during the wet season. It is situated wholly in New South Wales, has a general westward course, and receives the Lachlan as its principal tributary.

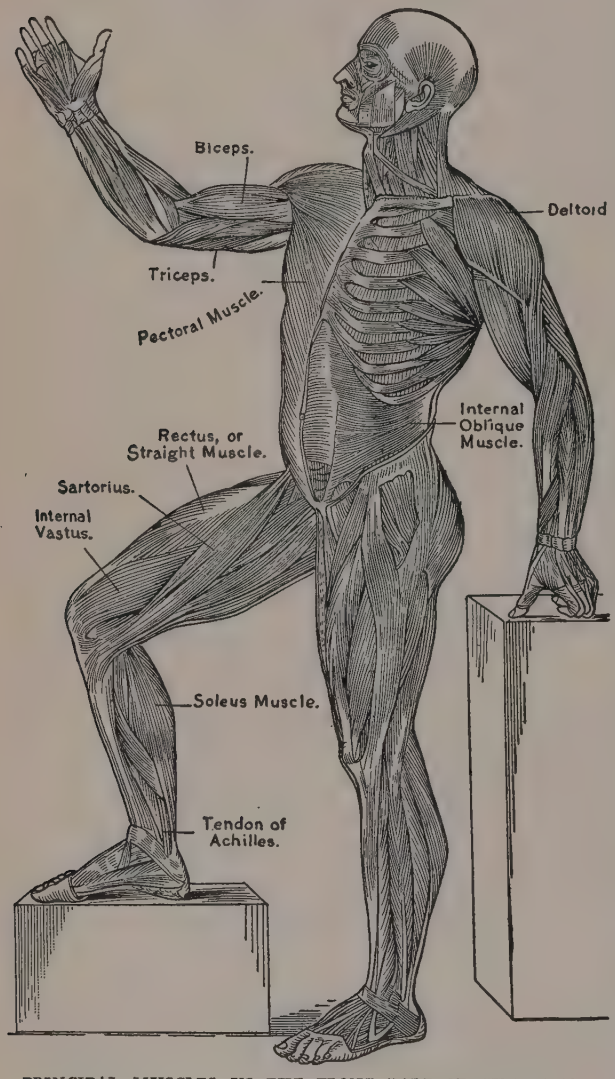
MUSCAT (mŭs-kăt'), or **Maskat,** the capital and principal seaport of the sultanate of Oman, or Muscat, on the Arabian coast of the Indian Ocean. The city dates from remote antiquity, but its prosperity began with Portuguese occupation in 1508, when it was made a flourishing trade center for the products of Northeastern Africa, Western Asia, and the East Indies. After the Portuguese occupied it for 150 years, it passed to the Iman rulers, a class of native princes, who extended their dominion over Eastern Africa and large tracts of Western Asia. At present it forms a part of Arabia. Population, 1925, 42,500.

MUSCLE SHOALS, the portion of the Tennessee River, in Alabama, which extends along part of the southern border of Lauderdale County, near the boundary between Colbert and Lawrence counties. This stretch of the river is about 37 miles long and has a fall of 134 feet. Florence and Sheffield, Alabama, are the chief points from which the location of the dams may be reached. Dam No. 1 is a small navigation dam 16 feet high, two miles below Wilson Dam, and has a lock for navigation purposes. Dam No. 2, known as the Wilson Dam, is 4,600 feet long and 117 feet high. It has tandem locks for navigation. The cost of this dam is estimated at $51,000,000. Dam No. 3, located 16 miles above Wilson Dam, is yet to be built. The plans include that it will be 5,700 feet long and 44 feet high. The cost is estimated at $25,000,000. Muscle Shoals plant is designated for the production of nitrates, the development of great quantities of power, and other commercial and industrial purposes.

MUSCATINE (mŭs-kă-tēn'), a city in Iowa, county seat of Muscatine County, on the Mississippi River, 25 miles below Davenport. It is on the Chicago, Rock Island and Pacific, the Electric Interurban, and the Chicago, Milwaukee and Saint Paul railroads. The noteworthy buildings include the high school, the county courthouse, the Musser Library, and many churches. It has a

soldiers' monument, a high bridge across the river, and a fine public park. The manufactures include pearl buttons, cigars, hosiery, bread, candy, marble and lumber products, ironware, machinery, pickled goods, flour, and earthenware. The surrounding country is fertile and is noted for the production of melons, fruits, sweet potatoes, and garden produce. It has an extensive trade in lumber and merchandise. The place was settled in 1833 and incorporated in 1839. Population, 1905, 15,087; in 1925, 16,821.

MUSCLE (mŭs"l), an organ composed of contractile fibers, through the contraction of which bodily movement is effected. Muscles



PRINCIPAL MUSCLES IN THE FRONT PART OF THE BODY.

constitute the flesh or meaty portion of the body, in which the framework is hidden, and, besides producing the varied movements, they give form and symmetry to the body. They vary in size from the large exterior muscles to the delicate ones hidden deeply within the body, many being so small that they cannot be seen with the naked eye. The total number of muscles in the human body is estimated at about 500, most of which are arranged in pairs, each with its antagonist, so that they contract and expand alternately, and thus effect motion by moving the bone to and fro. This is illustrated by grasping the arm tightly just above the elbow joint and then bending the forearm upward, when it is noticed that the muscles on the inside, called *biceps,* become prominent and hard, while the *triceps* on the outside are relaxed. Muscles on one side of the face draw the mouth in that direction when those on the other side become palsied, while squinting is caused by one of the straight muscles of the eye contracting more strongly than its antagonist.

By close examination of ordinary muscular structure it is easily noticeable that muscles are made up of fibers, the fibrous arrangement being systematic and regular in the direction of the course in which the muscle is to contract or act. A microscopic examination reveals two classes of muscles, the striped and the unstriped. The *striped* muscles are called *voluntary,* because they are under the control of the will, and by means of them the limbs stiffen or relax as a person chooses. The *unstriped* are *involuntary* muscles and are not under control of the will, such as constitute or control the blood vessels, the intestinal canal, and the heart, though the muscles of the last named organ are classed with the striped. Striped muscular fiber consists of fine long filaments, which break up into smaller fibrillae. The fibrillae are made up of fine disclike bodies, called *sarcotic elements,* and the fibers are surrounded by a delicate, transparent, sheathlike tissue, called *sarcolemma.* Unstriped muscular fiber appears as long cells that are pointed at both ends, containing granules and nuclei. The fibers are flat, arranged in the form of bundles, and contract more slowly than the voluntary muscular fiber.

The contractile tissue of the heart differs from the ordinary striped muscular fibers, which make up the great muscles of the body, in that they have long cross-bands instead of fine ones, and alternate dim and bright cross-bands pass through the whole thickness of the fiber. Another difference is found in the fact that no sarcolemma is present. The common name applied to the muscles of the heart and similar contractile tissues is *cardiac.*

Another distinguishing characteristic in muscular action is that causing the movement of the hairlike processes, or cilia, which are found upon certain surfaces of the body. The cilia bend their ends in a given direction and recover slowly, thus causing the fluids resting upon their surfaces to move in definite currents. Ciliary motion probably is due to changes going on in the protoplasm of the cell body. Cilia found in the air passages assist in the respiratory changes, causing movements in the smaller air passages of the lungs.

Muscles are usually attached with firmness to two or more points to be acted upon. The point remaining stationary is called the *origin,* and the point yielding to muscular contraction is designated the point of *insertion.* Some muscles are attached to bones at both ends and take their origin from either extremity, while in some cases one extremity ends with attachment to soft parts, in which case the action is to draw the attached portions toward the bone. In nearly all cases where the two ends are attached to bone surface the muscles furnish power to operate levers of any of the three classes. We have an illustration of the *first class* of levers in the movement of the head. The back or front of the head is the weight to be lifted, the backbone is the fulcrum on which the lever turns, and the muscles at the back or front of the neck are the powers by which we toss or bow the head. The *second class* of levers is illustrated when we raise the body on tiptoe. In that case the fulcrum is formed by the toes resting on the ground, the muscle of the calf of the leg acting through the tendon of the heel is the power, and the weight is borne by the ankle joint. The *third class* of levers is illustrated by lifting the hand from the elbow, when the hand is the weight, the elbow forms the fulcrum, and the power is supplied by the biceps muscle at its attachment to the radius.

In muscles illustrating any one of the three classes it is necessary that there be a joint intervening between the origin and insertion of these muscles, and the ease with which the work is done depends upon the nearness of the power to the weight or resistance. In the hand there is a marked loss of force from its being applied at a long distance from the weight, but there is a gain of velocity, since the hand moves a long distance by a slight contraction of the muscle. On the other hand, in the lower jaw the jaw itself is the weight, the hinge joint at the back is the fulcrum, and the muscles on each side form the power, and, since the muscular action is much closer to the resistance, there is a great force, but a much smaller speed. The muscles are attached to the bones by strong, flexible, but inelastic tendons, and from the sides of these spring the muscular fibers, thus permitting more to act upon the bone than if they went directly to it.

The *tendons* are much better fitted for exposure in passing over joints. They are less sensitive to pressure than the more delicate muscles, and serve to give both elegance of form and strength to the limbs. This is illustrated nicely in the muscles of the fingers, where the tendons give strength and beauty, but otherwise both inconvenience and bulk would exist. These tendons are attached to the muscles of the arm, but really extend only to the wrist, whence fine cords pass to the fingers. From this adjustment may be seen that here and elsewhere both beauty and strength are provided, while ample provisions are made for accuracy and efficiency in movement. The voluntary muscles are made up of small fibers composed of a row of minute cells arranged like a string of beads and the whole, being constituted of so many threads bound into one bundle, confers great strength. The efficiency of this mechanical principle is exemplified in suspension bridges, where strength to sustain vast weight is secured by small wires twisted into massive ropes, instead of heavy bars of iron. At the joints the bones are enlarged to afford greater surface for the attachment of muscles, and to enable them to work to better advantage.

Muscular contraction in living bodies is usually excited by nervous impulses, but slight electric currents are exhibited by the muscles. These currents are due, not to an external agent, but to the contractile energy inherent in the muscular elements. Heat, acid, pinching, and nervous impulse contract muscular fibers, and, if the stimuli be removed, the fibers resume their previous form and position. Acid is set free during the action. Muscular contraction produces a slight elevation of temperature. Muscular energy is exhausted by repeated contraction, and continuous activity tends readily to produce a condition under which the fiber ceases to contract. However, the muscle again responds under a different kind of stimulus, or after the contractile power has been restored by rest. Under the most extensive contraction the muscle is shortened to about three-fifths of its length. The nerves by which contraction is effected are known as motory nerves. They are under the control of the will. By skillful culture it becomes possible to call into activity muscular action of various kinds at the same time. Muscular movement is influenced quite largely by emotion and passion. Besides, some muscles are both voluntary and involuntary, especially those of the eyelid, over which we secure a partial control and wink constantly without effort or attention.

MUSKOGEE (mŭs-kō'gē), the capital of Muskogee County, Oklahoma, 150 miles northeast of Fort Worth, Tex. It is on the Missouri, Kansas and Texas, the Frisco, and other railroads, and is in a fertile farming country. The trade is chiefly in merchandise, grain, live stock, and machinery. It is the seat of the Bacone Indian College and the Oklahoma School for the

Blind. Many Indians reside within the city and in its vicinity. Population, 1920, 30,277.

MUSCOVY. See **Russia.**

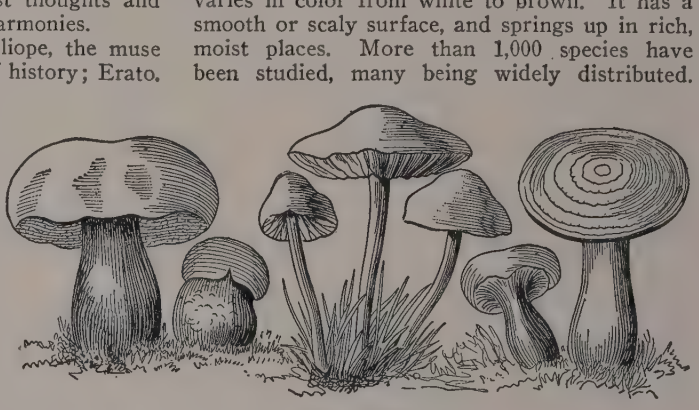
MUSCULAR SENSE, the sense which perceives muscular effort, or which reports feelings of the activity of the muscles of the body as concerned in movement. Most writers commonly agree that the senses are five in number, but some philosophers add a sixth sense, which they call the muscular sense, or the sense of resistance to muscular effort. This sense is lodged in certain sensory nerves which are lodged in the muscular tissue and are peculiarly connected with the brain, which is the seat of their centers. However, the muscle sense, or muscular sense, is not regarded by all writers as a separate sense, distinct from mere feeling.

MUSES (mūz'ĕz), a term used in Greek mythology to designate the nine beautiful daughters of Zeus and Mnemosyne. They originally presided over music, song, and dance, but with the progress of civilization the arts and sciences claimed these specially presiding divinities, and in later times they shared in the various functions of poetry and the sciences. Their honor was celebrated alike by mortals and immortals. Apollo was considered their leader in Olympus, and no festivity or banquet was complete without their joy-inspiring presence. No social gathering was held without supplicating their assistance, neither was any task undertaken that involved intellectual effort without looking to them for inspiration. It was thought that they endowed mortals with knowledge, wisdom, and understanding, that they bestowed upon the orator the gifts of eloquence, and that they inspired the poet with the noblest thoughts and the musician with the sweetest harmonies.

The nine muses included Calliope, the muse of epic poetry; Clio, the muse of history; Erato, the muse of poetry or passion; Euterpe, the muse of lyric poetry; Melpomene, the muse of tragedy; Polymnia or Polyhymnia, the muse of sublime hymn; Terpsichore, the muse of choral song and dance; Thalia, the muse of comedy and idyllic poetry; and Urania, the muse of astronomy. Pieria in Thrace was the original seat of worship of the muses, where they were supposed to have first seen the light of day and to have produced their sweet, soothing sounds. They loved to haunt the springs and fountains which gushed forth amid the rocky heights of mounts Hindus, Helicon, and Parnassus, all of which were sacred to them and to poetic inspiration. In statuary they were represented according to their mission. They held a prominent place in galleries and historic buildings.

MUSEUM (mū-zē'ŭm), an institution maintained for the preservation of works of art, science, literature, and antiquities. The name is from a Greek term, meaning a temple dedicated to the muses, hence a place to study art and literature. In ancient Greece the museums were sacred to the Muses, such as the groves of Helicon and Parnassus, but in later times the term came to be applied to a place of study or a school. At present museums are maintained in all the leading countries of the world, in which are preserved the great treasures of art, science, and literature. The noted museums of Europe include those of the Vatican at Rome, the New Museum in Berlin, the Louvre in Paris, the Belvidere in Vienna, and the British Museum in London. Many noted museums are maintained in Canada and the United States, including the Metropolitan Museum of Arts, New York; the National Museum, Washington; the Field Columbian Museum, Chicago; and the Ontario Provincial Museum, Toronto. These museums and others contain splendid collections of specimens of minerals, many antiquities, and works of art and science. The exhibits are classified and catalogued systematically, furnishing means for extensive study and research. Some of these institutions maintain courses of lectures and issue reports and pamphlets for the benefit of the public. Practically all are open to free admission for the public.

MUSHROOM (mŭsh'rōōm), a name commonly applied to numerous rapidly growing fungi of the higher class, belonging to the natural order *Fungi* and consisting usually of a caplike expansion supported by an erect stalk. The common mushroom has a fleshy head and varies in color from white to brown. It has a smooth or scaly surface, and springs up in rich, moist places. More than 1,000 species have been studied, many being widely distributed.



COMMON MUSHROOMS.

The forms are various in the different climatic zones. All the species are cryptogamic; that is, they have no true flowers containing stamens, pistils, and seeds, but propagate by means of spores. Many of the species are edible and in some cases their food qualities are quite wholesome. In various localities of Australia, Southern South America, and Tierra del Fuego varieties thrive that supply the natives with the prin-

(Opp. 1878)

EDIBLE FUNGI.

Common Mushroom.

Parasol Mushroom.

Yellow Mushroom.

Field Mushroom.

Common Field Mushroom.

Morel Mushroom.

cipal portion of their food. The cultivation of mushrooms is an important industry, particularly in Europe, where large fields are grown in beds prepared by mixing horse dung with earth. Sandy soil is best adapted to their culture, since it causes them to grow more rapidly. The stems of some species grow to a height of from eight to twelve inches and they bear tops correspondingly large, often from three to seven inches in diameter. Those cultivated for table use are largely bell-shaped, are of a whitish color, and have a pleasant odor and taste.

MUSIC (mū′zĭk), the branch of fine arts which relates to the agreeable combination and succession of sounds, either vocal or instrumental, and embraces melody and harmony. Its history is older than that of civilization, extending back to the remote ages and antedating the deluge. It is mentioned extensively in the history and fables of the Hindus and Chinese, with whom musical art is still quite like it was many centuries before the Christian era. Monuments, legends, and divers relics attest its popularity among various primitive races, who employed rude musical instruments in producing rhythmical divisions of time as accompaniments to games and amusements. Both the Hebrews and Egyptians employed music as a popular feature in divers forms of worship, and from the latter it passed to the Greeks and thence to the Romans. It is certain that music as an art began to be cultivated by the Romans largely through the instrumentality of the Etruscans, who originated several stringed instruments, and that they early became acquainted with the notes A B C D E F G, which formed the Grecian musical scale. Among them the Grecian instruments, especially the lyre, flute, and martial trumpet, were in common use and they obtained the harp and other stringed instruments from Egypt.

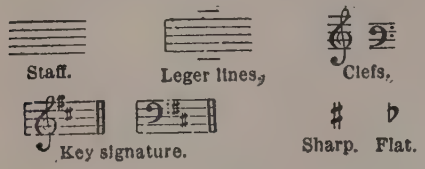
The syllables indicating the notes of the diatonic scale, known as do, re, mi, fa, sol, la, si, do, are of comparatively early Italian origin, but the first recognized Roman school of music may be said to date no earlier than the 16th century, when Claude Goudimel (1505-1572) exercised a wide influence. His pupil, Giovanni Piervanni Palastrina (1524-1595), did much to popularize music by adapting it to several masses, thereby establishing a sacred type still highly favored. Music in France had its rise with J. B. Lully in the latter part of the 17th century, when it also became a highly cultivated art in Germany and other parts of Western Europe. Under the influence of such masters as Handel and Johann S. Bach, Germany rose to the highest place in music by the middle of the 18th century, a position it still retains. Among the eminent musicians of Germany who introduced Italian melody are Mozart, Gluck, and Haydn, while among the masters who gave new poetic elements may be named Beethoven, Mendelssohn, Weber, Wagner, Liszt, Chopin, and Schubert. The German musician Meyerbeer popularized the new school of music in France and Handel introduced it in England. Among the new school of musicians are Rubinstein and Brahms in Germany, Bull and Grieg in Scandinavia, Paderewski in Poland, Dvorák in Austria, Sullivan and Stanford in Great Britain, Gounod in France, Boito in Italy, and Sousa in the United States.

A long period of time elapsed between the production of music of a recognized high scale and its general reception as a branch of study by the public not skilled in musical arts. Gradually the German masters cultivated an interest in music sufficiently extensive to carry musical instruction into the schools of Germany, whence it spread to the educational institutions of other European countries and to America. It is now looked upon as being equal in importance to other branches, particularly since it stimulates the aesthetic feelings, cultivates the voice, enlarges vocal powers, and supplies a valuable aid in discipline and reading. Many of the states of the United States and the provinces of Canada have added it to the school curriculum as a branch of study in which instruction is to be given daily. It is now almost universally incumbent upon teachers to pass an examination in that branch before receiving a license to teach. Much has been added to the popularity of music by competent instruction in normal schools and teachers' institutes. Many local and national associations of teachers have likewise given to it a guiding and molding influence.

In teaching music in schools the instructor should select the most familiar songs for the first lessons, as a means to gradually improve the tone and precision in singing. Tone perception is best cultivated by practicing oral dictation, and the practice of writing music is an efficient means of directing attention to the notation. However, it should be remembered that the mind rather than the vocal organs needs attention in the cultivation of tone and expression. The songs and exercises selected should embody thought and feeling, since by the agency of these a fuller and more wholesome expression is obtained.

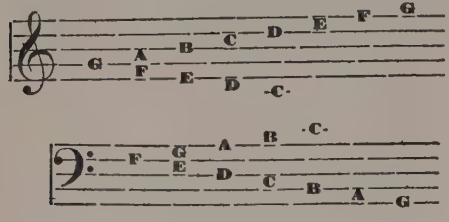
In the study of music we are to bear in mind that sound requires elastic media for its conveyance, as water or atmospheric air. Sound may be generated in the conducting medium, as by a pipe organ, or may be transmitted to it, as by the vibrations of the strings of a violin or pianoforte. Whether sound has a musical effect depends upon the number of vibrations, its musical character being limited between 16 and 8,180 vibrations per second. The frequency of the vibrations determines the pitch or relative height of a tone. The more rapid the vibrations the higher the pitch, while the grave or deep tones are produced by the lower number of vibrations. Loudness depends, not upon their number, but upon the broadness of the vibra-

tions. Musicians take the note called the middle C of the pianoforte as the *standard* or *concert pitch,* which is produced by about 515 vibrations per second. The *diatonic scale* is used to designate the regular tones of a key or scale, in distinction from chromatic or occasional tones, and



on it seven notes, designated by the first seven letters of the alphabet, are represented. A given note is in unison with one produced by twice as many or half as many vibrations per second, and the interval between them is termed an *octave.* The tone of rest, the tone above which all the other tones in a tune are grouped, is called the *keynote* or *keytone.* Each note of the diatonic scale has a fixed ratio to the keynote as regards *pitch,* which is determined by the number of vibrations.

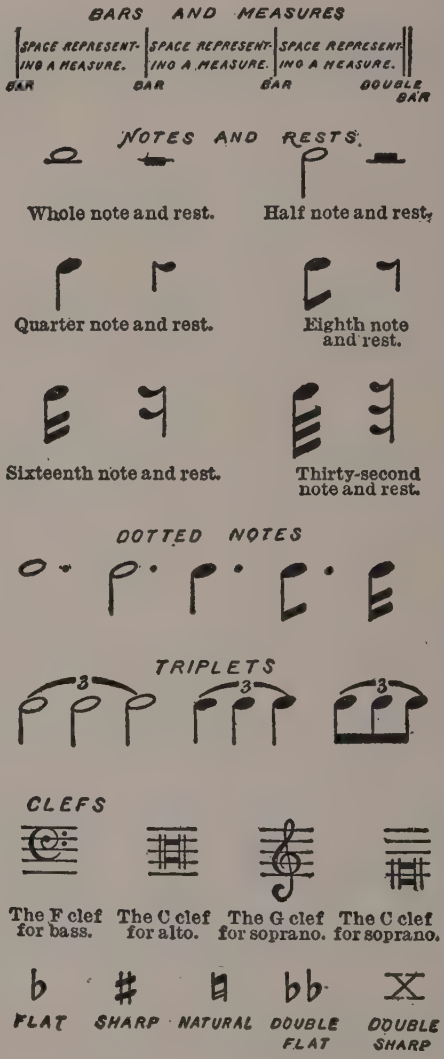
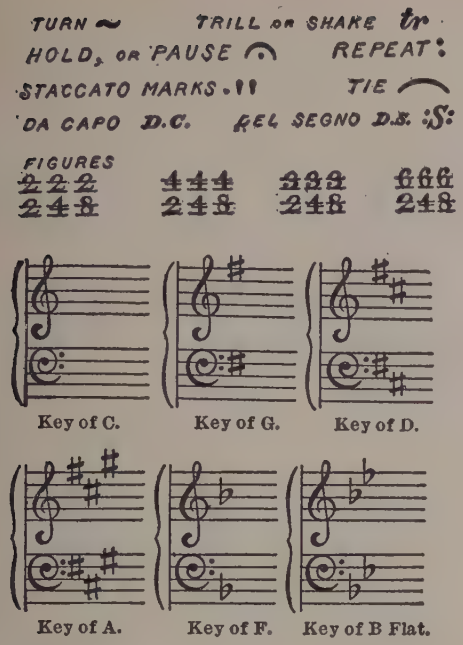
Music is written on a staff made up of five equidistant horizontal lines, but the lines may be extended by leger lines both above and below. To facilitate rapid reading it is customary to employ staves instead of many leger lines, as the bass, mean, and treble staves. The lines and spaces of the staff are called *staff degrees.* Each staff degree represents a tone of a certain pitch, this being shown by a *clef* placed at the left end of the staff. The two clefs in general use are the *G clef* and the *F clef,* and they indicate the pitch of the line on which they are curled. For instance, the G clef in the illustration is curled on the second line, hence the order below is F, E, etc., while above we begin with A and proceed upward to G. In a similar manner, the F clef is curled on the fourth line, which designates the order as shown in the figure, both above and below. To determine on what staff degree the scale begins and ends it is necessary



MUSICAL STAFF.

to have signs termed *key signatures* or *key signs,* and these are called *sharps* and *flats.* When a sharp is placed before a note, it indicates a tone a half step higher than the letter upon which the note is placed would otherwise represent, while a flat before a note indicates, on the other hand, a half step lower. There are five kinds of notes in common use, whose names are determined by their shape, as shown in the illustration below.

Most writers divide music into the three departments of melodics, rhythmics, and dynamics. *Melodics* is that department of music which treats of the pitch of tones. Tone has pitch, length, and power. As stated above, pitch is represented on a staff, each line and space of which is called a degree, and is numbered from the lowest upward. *Rhythmics* is the department of music which treats of the length of tones, while *dynamics* treats of the power of tones. Melody is the chief voice part in giving a harmonic composition, or a peculiar succession of sounds produced in single part by an instrument. *Modulation* is a change from one key to another. A *concordant* is composed of two agreeable sounds, and a *chord* is three or more sounds heard together. Below is a list of the principal musical signs:



MUSK, a substance obtained from the male musk deer, used in the preparation of perfumery and medicine. The musk deer is quite different from the true deer. It is found principally in the East India Islands and the continents of Asia and Africa. The musk is secreted by an abdominal gland that is equal in size to a hen's egg. Usually the entire gland is removed and transported to manufacturing centers in its natural state from Bengal and China, but the finest quality is secured from Tonquin. The secretion has a slightly bitter taste and forms the most penetrating and lasting of perfumes. It was used for embalming at an early date. Musk is an important article of commerce.

MUSK DEER, a species of deer native to Asia and Africa, about the size of the roedeer. The hair is long, coarse, and of a brownish color mottled with lighter blotches. This animal has no antlers, but a pair of long canine teeth characterizes the upper jaw of the male. The flesh is esteemed for food. Musk is derived from the male, that of the Tibet musk being of the best quality. See **Musk.**

MUSKEGON (mŭs-kē'gŭn), a city in Michigan, county seat of Muskegon County, on the Muskegon River, about four miles from Lake Michigan, on the Père Marquette, the Grand Trunk, and other railroads. It has an excellent harbor on Muskegon Lake, a body of water formed by the Muskegon River, and is the center of a large trade in merchandise and farm produce. The chief buildings include the public library, the county courthouse, a manual training school, and many churches. It has a soldiers' monument, electric street railways, public waterworks, and a system of sanitary sewerage. Among the manufactures are lumber products, machinery, furniture, ironware, musical instruments, and utensils. The surrounding country is fertile. It was settled in 1834 and incorporated as a city in 1869. Population, 1920, 36,570.

MUSKET (mŭs'kĕt), a kind of firearm formerly sed by the infantry of an army. It was originally fired by means of a match, or matchlock, for which the flintlock and later the percussion lock were substituted. This firearm is not in use at present, having been superseded by the rifle.

MUSKHOGEAN (mŭs-kō'gē-ăn), an important family of Indians in North America, constituting the principal tribe of the Creek Nation. Formerly they occupied a large area between the Atlantic and the Mississippi River, extending from the Gulf of Mexico north to Tennessee, but the descendants now reside in Oklahoma. Formerly they were the most warlike and politically powerful of the southern tribe. They have made marked strides of advancement in science, agriculture, and educational arts. The Muskhogean Indians at present number about 35,000, of whom 2,000 are scattered in the Gulf States and the remainder are in Oklahoma.

MUSKINGUM (mŭs-kĭn'gŭm), a river of Ohio, formed by the confluence of the Tuscarawas and Licking rivers, in Coshocton County. After a course of 115 miles toward the southeast, it joins the Ohio at Marietta. It is connected by a canal with Lake Erie.

MUSKMELON (mŭsk'mĕl-ŭn), a plant native to the warmer parts of Asia, but now cultivated extensively for its fruit, which is characterized by an aromatic flavor. The seed is planted early in the spring in rich, mellow ground, and the plant is an annual vine. The fruit, which varies from three inches to about a foot in diameter, has a warty, furrowed rind, and the flesh ranges from white to yellow or reddish yellow in color. Large quantities of muskmelons are grown for the market, either to be eaten fresh or used for pickles and preserves. The pests of this plant include several kinds of beetles, which eat the leaves with great voracity. These insects may be kept off by using an emulsion of terpentine, dusting with tobacco or slate lime, or spraying with paris green.

MUSK OX, an animal resembling an ox and a sheep, regarded as a connecting link between those two classes of animals. It is found native in the Arctic regions of America and individuals are met with as far south as the region corresponding to 60° north latitude. Fossil remains prevailing in various portions of Siberia and Northern Europe give evidence that in former times this class of animals was abundant in those regions, but at present no living traces are found there. The hair is long and tufted. It is brownish in color and above the shoulders and neck it is sufficiently thick to give the ani-

mal an appearance of being humped. Herds of from 25 to 50 are frequently found in groups while feeding on reindeer moss, grass, and other vegetable growth. The usual size is that of a small domestic ox, but the females are somewhat smaller. One calf is brought forth by the female in May or June. The musk ox is hunted for its skin and flesh, the latter being quite pleas-

MUSK OX.

ant to the taste and somewhat scented with the peculiar odor common to the animal. Its wool is about as soft as silk and has been used in making fabrics. The animal may be acclimated in all cold regions. Attempts at domestication have been made, but they have proven successful only to a limited extent.

MUSKRAT, a name commonly applied to several rodents that are characterized by the secretion of a musky substance, or the diffusion

AMERICAN MUSKRAT.

of a musky odor. However, several of the species classed as muskrats have otherwise little in common. The *common muskrat,* called *musquash* from its Indian name, is native to the regions extending from Mexico to the Arctic Ocean. It has webbed toes and the tail is flattened laterally. It occurs in abundance along the banks of rivers and lakes. In many places it constructs dwellings in the water that resemble small haystacks. It sometimes excavates channels in the banks near streams, the openings into these and into their dwellings being always from under the surface of the water. Muskrats are able to live in the water for a considerable period and in the winter spend much of the time in their dwellings, where numerous chambers are provided, but at the approach of danger make hasty retreat into the water by means of an underground channel. In size they are about equal to a small rabbit, but their form is much more bulky and the color is quite similar to the muddy banks where they dwell. Thousands of these animals are taken annually for their fur, which is of much value in commerce, while the Indians pursue them for their flesh. The muskrat feeds largely on vegetable growth, but particularly on the roots of plants, and on various animal food, such as mollusks.

The name muskrat is applied to an insectivorous quadruped of the shrew family, sometimes called *desman.* It is native in southern Russia and in the vicinity of the Pyrenees. Several species of the desman have been described, of which the best known has a body about eight inches long, small eyes, no external ears, a flattened tail, and long hairs. Its fur is valued in the markets of Europe. It is hunted for the skin and the musk secreted by a gland in the groin. Its habitations are along the streams, where it feeds on aquatic larvae, leeches, and vegetable growth. The name is sometimes applied to an animal of the shrew family found in India, which in size and habits resembles the common rat. The tail is long and the color is dark brown. It secretes a musk of pleasant and powerful odor.

MUSLIN (mŭz'lĭn), a thin cotton cloth, so named because it was first manufactured at Mosul, in Mesopotamia. It is now made extensively in Europe and America. Muslin is sold on the market as *bleached* or *unbleached.* It is divided into white, printed, or dyed fabric. Among the many varieties are lawn, cambric, mull, leno, figured, muslinet, cord, buke, and Swiss. A fine grade of figured muslin is known as *tamboured,* from its imitation of tamboured muslin embroidered by hand, though this class of fabrics is made by a loom.

MUSSEL (mŭs's'l), the common name applied to several species of bivalve mollusks and to a number of equivalves. The common freshwater mussels are distributed in many regions and abound in practically all the rivers, ponds, and lakes of America. These animals are most abundant where the bottom of streams or lakes is made up largely of fine mud, where they may be seen in considerable numbers moving from place to place. Mussels common to the sea occupy regions between low and high-water mark. They are fastened most commonly by their bys-

sus, a tuft of silken filament, to the places they frequent, but are able to move safely from place to place. The mussels common to America are rarely eaten, but are quite often used for bait by fishers. In many countries of Europe mussels are cultivated extensively for food, particularly in France, Germany, Great Britain, Holland, and Denmark. Mussels grow to maturity in about a year and are scooped up from the bottom by dredging. From the Firth of Forth and other waters of Great Britain many thousands of tons are taken annually to be used for bait in the deep-sea fisheries. This class of animal life furnishes a wholesome and highly prized human food, but, since mussels grow most abundantly in stagnant water, it is found that they are quite often affected by a dangerous poison brought on by microbes, thus making them productive of fatal diseases. The North American Indians were acquainted with the pearl mussel that yields fine pearls. They used the shells in making various kinds of small weapons.

MUSSET (mü-sā'), **Alfred de,** novelist, poet and dramatist, born in Paris, France, Nov. 11, 1810; died May 2, 1857. He descended from a historic family, was the son of a military officer, and secured a liberal education in law, medicine, and art. His tragical comedy, entitled "André del Sarto," appeared in 1833 in connection with his other work of value, entitled "Maramme's Caprices," both of which secured a wide reading. Other works of merit followed in rapid succession, winning for him the patronage of the most distinguished men and the best society of France. His complete writings have been published in ten volumes. Among his best works are "Night of October," "Chandelier," "Night of May," "Confession of a Child of the Age," "Rolla," and "Bettine."

MUSSOLINI (mŭs-ō-lā'nâ), **Benito,** public man, born at Dovia, Italy, in 1883. His father, an ironmonger, was unable to give him the advantages of an education, hence he studied by himself and became well versed in modern languages, history, literature and sociology. He wrote much against Freemasonry and, with the view of enlarging Italy, advocated breaking the Triple Alliance and entering the war against Germany. At first a socialist, he embraced nationalism, fought in the war, organized the party known as fascisti, and opposed communism and bolshevism. In 1921 the fascisti captured Italy by peaceful methods and he demanded the appointment as premier, to which the king agreed. Politically he has been an aggresive force against Greece, Jugo-Slavia and other countries.

MUSTANG (mŭs'tăng). See **Broncho.**

MUSTARD (mŭs'tĕrd), the name commonly applied to plants of the order *Cruciferae,* of which the black and the white mustard are the most common. Both these species are annual plants. They attain a height of from three to seven feet, bear lyrate leaves, yellow flowers, and slender pods containing a number of roundish seeds. They are native to Europe and Asia, but have been naturalized in North America and are cultivated extensively for the manufacture of condiments. Mustard is employed to a considerable extent in medicine, in the manufacture of oil of mustard, and for poultice purposes. The wild mustard, an obnoxious weed, is found in many of the cultivated fields. This plant has a tendency to multiply rapidly and injure the growing crops, especially wheat and other small grains, and can be eradicated only by careful cultivation. Among the plants which belong to the same order are the radish, cress, turnip, and cabbage.

MUTINY ACT (mū'tĭ-nĭ), or **Army Act,** an act to invest the British crown with the power to govern the army and navy and to devise articles of war. This act is passed annually by the British Parliament, since the Bill of Rights forbids the maintenance of an army in the time of peace, and without an annual vote it would be impossible to provide for the defense of the country in the manner of the great powers. It has been universally the practice to pass the Mutiny Act annually since 1689, but this act and the Articles of War were combined in 1879, and since that year the two have constituted one bill, called the Army Act.

MUTOSCOPE, an apparatus for reproducing the motion of objects. The scenes shown in the mutoscope are obtained by making a series of photographs of the moving objects, on a long band of celluloid film at the rate of about eighteen hundred pictures per minute. The time interval between the successive pictures is thus only about the thirtieth part of a second.

Photographic prints are then made from a strip of negative pictures and these prints are arranged in regular order around a cylinder. When the cylinder is revolved, the cards are allowed to snap forward one after another, thus presenting the photographs to the eye in the order and at the same rate of speed at which they were originally taken. The velocity is so great that the eye does not appreciate the change from one picture to another and the observer seems to be looking at one picture in which the objects move as did the original.

By this process any moving scene may be reproduced. The rapid flight of an express train, the movements of a watch, the maneuvers of a war vessel, and the movements of an insect are scenes which may be reproduced and which illustrate the possibilities of the art.

MUTSUHITO (mŏŏt-sŏŏ-hē'tō), Emperor of Japan, born at Kyoto, Japan, Nov. 3, 1852. He ascended the throne at the early age of fifteen years under a regency and his influence in the former part of his reign was limited. However, he accepted the constitution as the fundamental law, introduced political reforms, and encouraged the extension of internal improvements. During the period of his incumbency

the nation made rapid strides in the development of modern arts and industries and the territorial limits were greatly extended as a result of two wars, those with China and Russia. It is not certain that his influence on the fortunes of the nation have been very marked, as he seems to have been less self-exertive than most modern monarchs. He died July 30, 1912, and was succeeded by Yoshihito, whose reign is known as *Taisei,* or era of great righteousness.

MUTTON (mŭt'tn), the flesh of a sheep, constituting a nutritious and wholesome article of food. Canada and the United States are large producers of mutton, both in the form of fresh and cured meats, and considerable quantities are exported. The fatty parts, known as *tallow,* are used largely for candles and for lubricating purposes. A rib of mutton for broiling, with the end of the bone at the smaller part chopped off, is known as a *mutton chop.* The mutton kept for sale in the markets of the cities is prepared at the packinghouses, after which it is sold to the consumers by the retail dealers. A large part of the mutton consumed in England is obtained from Australia and New Zealand.

MYCENAE (mī-sē'nē), an ancient city of Greece, in the northeastern part of Argolis, in the Peloponnesus. It was founded by Perseus and was the residence of Agamemnon before the Trojan War. At that time it was considered one of the most important Grecian cities. Later the military forces of Argos destroyed much of the city, but it was again rebuilt. The ruins still remaining are of interest on account of their great antiquity, among them the Treasury of Atreus and the Gate of Lions. Many interesting antiquities have been brought to light by a series of excavations, notably those carried on by Henry Schliemann in 1876, when various weapons, tombs, ornaments, and monuments were discovered. It is thought that most of these objects of interest were constructed during the Doric invasion, for the reason that they appear to be allied to the types produced in various portions of Asia Minor and Mesopotamia.

MYERS (mī'ĕrz), **Frederic William Henry,** poet, born at Keswick, England, Feb. 6, 1843; died Jan. 17, 1901. He studied at Cheltenham College and Trinity College, Cambridge, and was fellow and classical lecturer in the latter from 1865 until 1868. Subsequently he was inspector of schools and not only contributed to current literature, but wrote a number of poems and essays. In 1865 he published a volume entitled "Poems" and in 1882 appeared his "Renewal of Youth." His essays were widely read, which he published under the title "Science and a Future Life," "Life of Wordsworth," and "Essays Modern and Classic." His "Human Personality and Its Survival of Bodily Death" was published two years after his death.

MYOPIA (mī-ō'pĭ-à), a condition of the eye that produces nearsightedness or shortsightedness, due to a deformity which causes the rays from distant objects to be brought to a focus before they reach the retina, hence form an indistinct image. However, rays from objects very near to the eye are normally converged so as to produce a distinct image. Concave lenses may be used to remedy the defect.

MYRIAPODA (mĭr-ĭ-ăp'ō-dà), a class of animals closely related to the hexapod insects, differing from them in having the body made up of numerous segments, nearly all of which have jointed legs. They are singular in that the body is not divided into thorax and abdomen, as in insects, and in that the mouth is furnished with a complex masticating apparatus. The eyes are simple or compound, but in a few species the eyes are entirely absent. Some feed on vegetable matter, though the species that are higher in the scale of organization are carnivorous, feeding on insects and worms. They are found under stones and logs or in dark and damp places. The centipede (q. v.) belongs to this group of animals.

MYRMIDONS (mĕr'mĭ-dŏnz), the celebrated troops of Thessaly that accompanied Achilles in the Trojan War. They ranked among the most famous warriors of ancient Greece. Under the leadership of Peleus, they came into Thessaly and later colonized the island of Aegina. The name Myrmidons was applied to them from the legend that they converted the ants into men, the term meaning ants.

MYRRH (mĕr), a gum resin that exudes from a shrub native to Arabia, Abyssinia, and Somaliland. The myrrh shrub or tree has a whitish-gray bark, is quite low and branchy, and bears a fruit about the size of a pea. Myrrh occurs in the form of roundish and irregular masses, called *tears,* which vary from small grains to the size of an egg. They are semitransparent and have a reddish-brown color and a peculiar and agreeable fragrance. The ancients used myrrh extensively for incense, in embalming, and for perfume. At present it is still employed for perfume and in medicine. It is slightly soluble in water and alcohol, but may be dissolved readily in chloroform. The best quality in the market is known as *Turkey myrrh,* being brought from Turkish

MYRRH.

ports, and inferior grades are secured from Bombay and other Indian points.

MYRTLE (mĕr't'l), a genus of plants which are classed as a suborder of the *Myrtaceae*. Although these plants are native to Western Asia, they have been naturalized quite extensively in Europe and other regions. The leaves are opposite, the flowers are axillary or terminal, and the bloom is principally white or pink colored. Most species bear black berries with a pleasant, spicy odor. They are used in the preparation of medicine for dysentery, rheumatism, diarrhoea, and internal ulcers. The leaves are employed in the preparation of perfume and for making a gargle. This class of plants has been renowned from ancient times as of service in yielding beautiful foliage, for preparing wreaths and other ornamentations for adorning heroes of war, in the performance of religious rites, and as an emblem of civic authority. The South American myrtle is found largely in Chile and Peru. It supplies foliage and berries equal in value to those of Europe. Both species were utilized by natives for medicine and food from an early time. The common running plant known as periwinkle, found extensively in the United States, is frequently called myrtle, though the appellation is improper.

AMERICAN MYRTLE.

MYSORE (mī-sōr'), or **Maisur**, a city of India, capital of a native state of the same name, 245 miles southwest of Madras. The streets are platted at right angles and are well improved by grading and paving. The area is four square miles, most of which lies on the slopes of Chamundi Hill. Among the principal buildings are the Maharaja's palace, the public hospital, and many churches and temples. It has considerable manufactures of silk and cotton goods, jewelry, cutlery, metal ware, and utensils. Population, 1922, 69,315.

MYSTERIES (mĭs'tĕr-ĭz), the name applied to a class of dramatic performances given in the Middle Ages. It is probable that the idea of presenting these plays originated from the Mysteries of the Greeks and Romans, but they were less cultured than the *Eleusinian* of the Greeks. They were presented originally in churches and at solemn festivals and in a manner quite similar to the miracle plays. These plays treated religious subjects and were so named because their purport was to exhibit the teaching and effect of the mysterious doctrines of Christianity. They differed from the miracle plays in that in the latter were represented more largely scenes from the lives of the saints. The mysteries offered a very effective way of attracting attention to the scriptural teachings, especially among the peoples of Europe, who had not yet learned of the purport and plan of the Scriptures as they relate to the salvation of mankind. At the time of the guilds and trades these exhibits were given in series, some of the plays requiring several days. Among the most noted of these plays were those known as "The Wise and Foolish Virgins," "The Passion of Christ," and "The Slaughter of the Innocents." In later times Milton's "Paradise Lost" and several other writings were utilized in the exhibits. See **Miracle Plays.**

MYSTICISM (mĭs'tĭ-sĭz'm), in religion, the doctrine of the Mystics, who claimed to hold direct communion with the Diety. These worshipers asserted that they acquired a knowledge of God and of spiritual things which is unattainable by the natural intellect and which cannot be analyzed or explained, hence the name. This form of religion is very ancient, dating from an early period in the history of India. It has its modern representatives in Brahmanism, Buddhism, and some forms of Christian theology. Mysticism, as applied in philosophy, is the doctrine that an act of feeling or faith is involved in the ultimate principles of knowledge or belief. The philosophic mystics seek either to grasp the ultimate elements of knowledge by means of the reason, or to draw out in terms of the reason the data of the faculty by which it is grasped.

MYTHOLOGY (mĭ-thŏl'ŏ-jў), the science that investigates the meaning of myths or legends and traces the relationship between the myths of different peoples and countries. Myths of various kinds have been common among different peoples from remote antiquity and, though they differ in various respects, there is a marked similarity among many of them. Even the savage races of the present time pass their fables, traditions, and myths from generation to generation. The myths of different peoples have been collected carefully by writers and naturalists, especially those of the ancient peoples of Hindustan, Egypt, Greece, and Rome. More recently extensive study has been given to the myths of the early races of Europe and America, especially to the folklore of Scandinavia and the Esquimos. However, the myths of civilized peoples, like those of the Greeks, Romans, Egyptians, and the inhabitants of Western Asia, remain of greatest interest. This circumstance is accounted for because they are related more nearly to the early history of the people at present representing the highest civilization, and for the further reason that they enter largely into

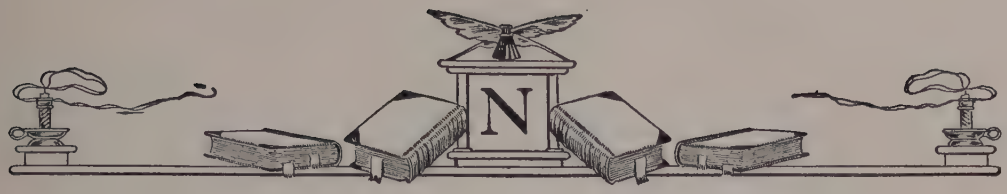
the works of art, such as paintings, sculptures, and architecture.

Students of mythology were prevented from making material progress in mythological study until within the last few centuries, for the reason that they were confronted by orthodox traditions and because they had little knowledge of the natural history of man and the ancient languages. It is but comparatively recent that the languages of the Chaldaeans and Egyptians have become unsealed, and still more recent that material progress began to be made in the systematic study of Sanskrit. The myths of civilized people do not fail in containing both rational and irrational elements, and, as we approach nearer to the more savage and primitive, the irrational is multiplied with rapidity. The rational elements of myths are those which represent the gods as wise, mighty, and beautiful beings, while the irrational present a series of silly and meaningless phenomena. Among the latter are such as represent unnatural and absolutely impossible conditions or changes, including many that attribute certain powers and inclinations to the gods of the Greeks and the Romans.

The Grecian god Zeus is said to have dwelt on Mount Olympus, where a great statue was erected to his honor. Homer describes him as a god who beholds all things and turns his shining eyes everywhere. By others it is said that he was buried in Crete, but later assumed the shape of a swan and became the father of Castor and Pollux. In another instance he is spoken of as being afraid of Attes. Later the Greek god Zeus became identified with the god Jupiter of the Romans. Odin, Balder, and Thor were among the Scandinavian gods. The Egyptian mythology is closely associated with the gods Ammon, Osiris, Apis, and Serapis. The belief in the immortality of the soul of man was common in ancient Egypt, hence entered as an important factor into the Egyptian mythology and religious beliefs.

Max-Müller, one of the most thorough and successful investigators of ancient mythology, designates three predominating parts or lines common to all systems of myths; namely, religious, historical and poetical. While mythology is not religion, history, philosophy, or poetry, it comprehends elements of all these under a form of expression that is natural and intelligible in certain stages of the development of society, but, after thought and speech had sufficiently developed, it became tradition, and in that sense is largely unintelligible and unnatural. See **Jupiter; Odin; Vulcan; Apis; Zeus;** etc.

MYTILENE (mĭt-ĭ-lē′nę). See **Lesbos.**



N, the eleventh consonant and fourteenth letter of the English alphabet. The form was adopted through the Roman alphabet from the Greek. It is classed as a nasal liquid of the lingual class. The letter *n* is sounded by placing the tongue near the roots of the upper teeth and emitting a vocalized sound through the nose. Its ordinary sound occurs when used in such words as *tongue, knot,* and *done,* but it has a guttural nasal sound before gutturals, as *g* or *k,* when it is almost equivalent to *ng,* as in *sing, finger, song, drink,* and *link.* When used after *m* as a single letter it is silent, as in *hymn, condemn,* and *autumn,* but when preceded by *p, k, g,* or *m,* it alone is sounded, as in *pneumatic, know, gnaw,* and *mnemonics.* As a symbol, in chemistry, *N* is used to represent nitrogen and *Na,* sodium (i. e., natrum).

NABONASSAR, Era of, the time at which Babylonian chronology began, which was later adopted by the Greeks of Alexandria and other peoples. Ptolemy calculated by astronomical phenomena that Nabonassar ascended the throne of Babylon on Feb. 26, 747 B. C., which date became the beginning of the year according to the Era of Nabonassar.

NABOPOLASSAR, King of Babylonia, who ruled its destiny for twenty years, from 626 to 605 B. C. It is thought that he rose from a humble station in life to supremacy in Chaldaea, which he governed successfully under a state of semiindependence, but in 625 B. C., after the death of Asshurbanipal, he conquered Babylonia. In 607 B. C. he captured Nineveh and added Assyria to his dominion. These dates and events seem to be borne out by various inscriptions dating from his time. He was succeeded by his son, the great Nebuchadnezzar.

NACHTIGAL (näk'tē-gäl), **Gustav,** noted traveler, born in Eichstedt, Germany, Feb. 23, 1834; died April 10, 1885. He secured a liberal education, took a course in medicine, and until 1863 remained in Germany as an army surgeon. At that time he made a tour to North Africa, and in 1868 was commissioned by the King of Prussia to convey presents to the Sultan of Bornu. In 1869 he left Tripoli for Bornu, proceeding by way of Fezzan and Tibesti. After exploring various portions of Bornu and Bagirmi, he returned home in 1874, making the return trip by way of Wadai, Darfur, Kordofan, and Cairo. In 1879 he published the results of his travels in the Sahara and the Sudan, a work that contains the first information secured by modern travelers of many parts of Africa. The Emperor of Germany commissioned him, in 1884, to annex several regions on the western coast of Africa, including those known at present as Cameroon, Angra Pequeña, and Togoland. His death occurred off Cape Palmas while making the return journey.

GUSTAV NACHTIGAL.

NADIR (nā'dēr), a term used in astronomy to designate the point of the celestial sphere which is directly beneath where one stands, diametrically opposite the zenith, or the point directly overhead. The two poles of the horizon are formed by the zenith and the nadir.

NADIR SHAH (nä-dēr' shä), eminent ruler of Persia, born near Kelat, Persia, in 1688; assassinated June 20, 1747. He was a member of a powerful Turkish tribe, and entered the service of the governor of Khorassan at the age of 21, but was degraded for an alleged offense. Soon after he organized a band of 3,000 marauders and took possession of Kelat and the whole of Khorassan. At that time an Afghan dynasty had control of Persia. To overthrow its rule, Nadir succeeded in securing the enlistment of large numbers of his countrymen. His military movements were supported by the Persians, who had a traditional hatred of the Afghans, and it became an easy matter to defeat their chief, Melek Ashraf, and clear the entire country of Afghan influence. Tamasp now became the ruling sovereign of Persia, while Nadir secured the governorship of Seistan, Khorassan, Kerman, and Mazanderan. In 1731 he invaded the Armenian provinces to expel the Turkish

usurpers, and, after returning from a successful campaign, removed Tamasp from the throne for incompetence and elevated his infant son, Abbas III., to the same position in 1732, but, when that sovereign died, in 1736, Nadir was elevated to the throne as Nadir Shah. Immediately he began to plan gigantic military operations, conquered Georgia from the Turks, annexed Afghanistan, and reduced large portions of India. From the latter country he brought to Persia the celebrated Kohinoor diamond and other valuable prizes worth $100,000,000. His assassination was due to the tyrannical policy adopted in the latter part of his reign. A son survived him. He was educated as a Catholic at Vienna, entered the Austrian army under Empress Maria Theresa, and secured a reputation as Baron Semlin.

NAGASAKI (nä'gȧ-sä'kĕ), a seaport city of Japan, on the western coast of the island of Kiushiu. It was the only Japanese harbor opened to European trade for about two centuries. In 1859 it was one of the five Japanese ports opened to the trade of America and several European countries, and ten years later was included in the seven seaports opened to the trade of the world. The city is beautifully situated and has a splendid harbor. Among the manufactures are chemicals, lacquered wares, silk, fabrics, tobacco products, porcelain, and utensils. It has a large export trade of Japanese products and a correspondingly important import business. Several missionary establishments are located at Nagasaki, including those supported by the Americans, Dutch, British, French, and Germans. Vast dock facilities have been built in recent years, which rank among the largest and most important improvements of this character in Japan. It has telephones, pavements, electric lights, and other modern facilities. Population, 1922, 186,392.

NAGOYA (nä'gŏ-yȧ), a city of Japan, on the island of Hondo, about 165 miles southwest of Tokio, a short distance north of Owari Bay. It formerly was the capital of the princes of Owari, and is still the chief city of the province of that name. Its seaport is at Yokai-ichi. The city is noted for its manufacture of pottery, porcelain, lacquered work, utensils, and cotton and silk fabrics. It has a number of public buildings, including a fine post office, a hospital, a normal school, superior court, the public library, and the central railroad depot. Nagoya is the seat of a number of fine churches and temples. It has electric and gas lights, street railways, pavements, and waterworks. Population, 1922, 490,936.

NAGPUR (näg-pōōr'), a city of India, capital of the province of Berar. It is the focus of several railroads, giving it trade conveniences with the leading ports of India. The city is situated in the valley of the Nag River, a small stream, is surrounded by a fertile country, and occupies a fine site. Its temperature is hot and the climate is unhealthful. Among the manufactures are cotton textiles, woolen and silk goods, turbans, metal products, machinery, blankets, and utensils. It has a large trade in salt, grain, and merchandise. On Nov. 27, 1817, it was the scene of an important battle between a force of 1,350 British commanded by Colonel Scott and a native army of 18,000 men, in which the latter was defeated. Population, 1922, 150,870.

NAHUM (nā'hum), the seventh of the twelve minor prophets, author of the vision of Nahum, the Elkoshite, in which prophecies are directed against the city of Nineveh. It is thought that he was born in a village on the east side of the Tigris, called Elkosh, and that he prophesied about 712 B. C. His work is clear in style, original, and full of animation, and he uses the purest classical Hebrew. Tourists are shown a grave thought to be that of the prophet at the modern town of Elkauseh, in Upper Galilee, but some writers think he was buried on the banks of the Tigris.

NAIADS (nā'yădz), in mythology, the nymphs who presided over the waters of fountains and brooks. They were supposed to inspire those who drank the water with oracular powers and the gift of poetry. In statuary they were represented as beautiful maidens, half draped, wearing long hair.

NAILS, the name of headed pins or spikes of metal, usually with rounded or flattened heads and commonly made of steel. They serve a useful purpose in that they hold together different pieces of wood, leather, or slating. In size and construction they differ very materially, depending upon their use in carpentry, saddlery, upholstery, horseshoeing, shoemaking, slating, and other enterprises. The manufacture of nails has long been an important industry and the consumption is enormous in all civilized countries, especially where lumber is used in the construction of houses and other buildings. They are made of many forms on account of the different purposes for which they are employed. Among the various kinds are spikes, fencing nails, building nails, clouts, roseheads, clasps, sprigs, brads, tacks, and many others. They are classed usually according to their manufacture into four principal divisions: *hand-wrought nails, wire nails, machine-wrought nails,* and *cast nails.*

Formerly nails were manufactured entirely by hand labor, each nail being forged from a thin sheet or rod of iron, and male and female laborers were employed in their production. An American inventor completed a device in 1810 by which it became possible to cut 100 nails per minute from a sheet of iron, the heading being done in the same operation. Subsequently vast improvements were made in the machine, whereby it has become possible to make as high as 1,000 nails per minute, the number varying somewhat according to the class of nails pro-

duced. The usual process includes the heating of strips of metal, then passing them into the machine to be cut, and, after falling to a receptacle below, they are clasped by an ingenious mechanical device to be struck with a force sufficiently powerful to form the head. Wire nails have gone largely into use for ordinary building purposes, but machine-wrought and cast nails are employed in finishing work, such as making casing and attaching ornaments. Hand-wrought nails are used in horseshoeing and for other purposes in which clinching is necessary.

NAILS, the horny plates or protective coverings on the phalanges, or fingers, and toes of many animals. They are constituted of modified forms of the cuticle. The nails are generally set in a matrix or groove in the cuticle, from which they grow at the root in length and from beneath in thickness. In most animals the matrix is thick. It contains highly vascular papillae. As long as the papillae are not destroyed the nail is replaced after an accident. The nail structure differs largely in form and size in different animals. Nails form an elastic covering on the dorsal surface of the fingers and toes in man. In hoofed animals, like the horse and camel, they constitute a protective covering known as *hoofs.* Birds, flesh-eating animals, and sloths have modified forms of growth known as *claws,* which are especially adapted to clasping elevated vegetable forms or for scratching. In many amphibious animals, like the toad, they appear only as an enlargement or a thickening of the skin. A light spot at the base of the nails in man is known as the *lunula.* The nails of the fingers grow much more rapidly than those of the toes.

NAMAQUALAND (nä-mä'kwä-länd), the name applied to a region of Southwestern Africa. It consists of two portions, Little Namaqualand and Great Namaqualand. The former is situated south of the Orange River and now forms a part of Cape Colony, while the latter extends from the Orange River to Walfisch Bay. Since 1884 the latter has been a possession of Germany, being a part of German Southwest Africa. The original inhabitants of this region are known as Namaquas, a Hottentot tribe governed by petty chiefs. They subsist largely by following a pastoral life. At present there are about 50,000 of these people, most of whom are in the German possessions. Within recent years material progress has been made among them by missionaries and teachers.

NAME, the word or words by which a thing, place, or person is designated, including common and proper names. This article treats only of the names of persons, which are divided into *given,* or *baptismal,* names and *family,* or *surnames.* It is probable that all names originally were significant, and that in the lapse of time and the change of languages the meaning of them has been lost. This is true of the American Indians, who applied names that signified some important event in the life of the individual, hence we have Sitting Bull, Blackhawk, and Man Afraid of His Horse. A savage who killed a wolf might be afterward named Wolf, and one who dreamed of an eagle, Dream Eagle.

The early Hebrews named their infants from some peculiar circumstances relating to them. In this way they aided in commemorating the history of the family. The first son of Eve was named Cain, meaning gotten, from the circumstance that she said, "I have gotten a man from the Lord." Other names signified some religious sentiment, though nearly all of the early names constituted a single word. Noah signifies comfort; Jonathan, gift of God; Deborah, a bee; Tamar, palm tree; and Adah, ornament. Surnames were not used among the Hebrews, Babylonians, Egyptians, Persians, or Greeks, which was true in the early times of the Romans, but the last mentioned people finally came to use three names. These were the *praenomen,* or personal name; the *nomen,* or name of the clan; and the *cognomen,* or family name, as Publius Cornelius Scipio. In many cases the daughters received the praenomen form of the father's name, as Octavia from Octavius and Julia from Julius. Those who conquered a city or nation were frequently complimented with an additional name to indicate the conquest, as Publius Cornelius Scipio Africanus.

The people of Western Europe usually applied names that signified some circumstance or the locality in which the person or family resided. This is true particularly of Holland, where this practice is still indicated by many names in common use, such as *van der Bilt,* compounded into Vanderbilt, signifying "man of the picture," the word *man* being understood without being written. Many of the Anglo-Saxon names are from Danish and German origin, such as *Ethelred,* meaning noble in speech, being a compound of the German words *edel* and *Rede.* Other names of this class include *eardwulf,* wolf of the earth; *Sigfred,* peace of victory; and *Werburg,* hedge of the town. Many of the English names indicate descent, such as *Williamson,* meaning the son of William. The use of *-son* in English has the same force as the German *-sohn,* the Danish *-sen,* the Russian *-vitch,* the Norman *Fitz,* the Irish *O',* and the Scotch *Mac.* In most countries the surname of the husband becomes that of the wife, though in Spain both retain their full names, leaving it optional with the son to choose whichever may be preferred, either the paternal or the maternal. The change of names is permitted without legal process in some states and nations, though most of them provide that a name cannot be changed except by the order of a court or the act of a legislature.

NAMUR (nā'mûr), a city of Belgium, capital of the province of Namur, 35 miles southeast of Brussels. It is at the junction of the Meuse and the Sambre rivers, has railway connections

with the principal cities of the kingdom, and contains large cavalry barracks. Opposite the Meuse River is Jambes, which is reached by several bridges. It has the Cathedral of Saint Aubin, a structure in the Renaissance style. Other buildings include a museum, the city hall, and a number of schools. Glass, cutlery, hardware, and leather are manufactured. The city was captured by William III. in 1695. It was captured by the French in 1792 and by the Germans in 1914. Population, 1922, 32,193.

NANAIMO (nȧ-nī′mō), a seaport of British Columbia, on the island of Vancouver, opposite the city of Vancouver, on the mainland. It is on the eastern coast, near Departure Bay, and is connected by a railway with Victoria and other trade centers. The surrounding country is celebrated for its coal fields, which yield a large output for transportation. It has gas and electric lighting, waterworks, sawmills, and a system of telephones. The first settlement on its site was made by the Hudson Bay Company in 1833 and it was incorporated in 1874. Population, 1901, 6,130; in 1921, 9,088.

NANA SAHIB (nä′nȧ sä′hīb), a celebrated native leader of India, who was born about 1825 and became famous because of leading the Sepoy insurrection of 1857. His education was that of a Hindu nobleman. He was adopted as the son of the Mahrattas sovereign, and was proclaimed by the mutineers as their *peshwa.* The extension of English rule was opposed strenuously by the Indian natives, on account of which the mutiny occurred in Cawnpore in 1857, and, after besieging the Europeans, they promised to allow them to escape safely to the Ganges on condition of surrender. However, as soon as they capitulated a general massacre of the men, women, and children followed. Sir H. Havelock soon after defeated the Sepoy leader, but he escaped into Nepal. It is thought that he finally found safety in Central Asia, but his real fate remains a mystery.

NANCY (năn′sĭ), a city of France, capital of the department of Meurthe-et-Moselle, 175 miles east of Paris. It is nicely situated on the Meurthe River, has good railroad connections, and is the center of an extensive trade. The principal buildings include a bishop's palace, the Hôtel-de-Ville, a number of splendid churches, and several government buildings. Among the adornments of the city is a statue of Laszcinski, King of Poland, who was Duke of Lorraine from 1735 until 1766. It has manufactures of embroidery, cotton and woolen goods, ironware, muslin, spirituous liquors, machinery, earthenware, and artificial flowers. It is the seat of the University of Nancy and has a public library of 100,000 volumes. The Germans occupied it from 1870 until 1871. Population, 1906, 110,570; in 1921, 119,949.

NANKEEN (năn-kēn′), a cotton cloth of a buff-yellow color, so named from its manufacture in Nanking, China. Formerly this material was used extensively for trousers and other articles of clothing, but imitations are now made by dyeing the white cotton. However, they are much inferior to the genuine Chinese article, the color of which is natural to the material and not to the effect of a dye.

NANKING (năn-kĭng′), or **Nankin,** a city of China, capital of the province of Kiangsu, 550 miles south of Pekin. It is finely located on the Yangtse Kiang, is surrounded by a wall about forty feet high, and is noted as one of the centers of Chinese literature and learning. The city has an important navigation trade and manufactures of satin, porcelain, utensils, fireworks, wearing apparel, and toys. Anciently the city was known as Kin-ling. It formed the seat of the Han dynasty from 206 B. C. to 25 A. D., and in 1368 was made the southern capital of China by the Ming dynasty. In the latter part of the 14th century its importance was lost for the reason that the capital was removed to Pekin, and from 1853 to 1864 it was held by the rebellious Taipings as their seat of government. At that time the porcelain tower, a structure 200 feet in height, built in 1432, was destroyed, and in the same insurrection many of the tombs, palaces, and other public buildings were put in ruins. Population, 293,540.

NANSEN (nän′sĕn), **Frithjof,** Arctic explorer, born in Christiania, Norway, Oct. 10, 1861. After attending several creditable institutions of higher learning, he was made curator of the department of zoölogy of the Bergen Museum in 1882, and while serving in that position made several expeditions to collect antiquities. In 1882 he explored the seas of Iceland and Greenland, and in 1888 succeeded in crossing the ice cap of Greenland from the eastern to the western coast. Soon after he published an account of this expedition in a work entitled "Across Greenland." The discoveries made at that time led him to believe that an open current of water flows constantly across the polar basin from Bering Sea, and that it is possible to enter the path of this current and succeed in reaching within a very short distance of the North Pole. Soon after he designed a vessel with rounded sides, constructed in such a manner that ice floes would lift instead of crush it when coming in contact. With twelve companions he started in this vessel, called the *Fram,* from Mardoe, Norway, on July 21, 1893, with the view of reaching the ice drift. He passed by the New Siberian Islands, crossed the Kara Sea, and was not heard of again until

FRITHJOF NANSEN.

Aug. 13, 1896, when he returned safely to Mardoe.

The account of northern explorations, published by Dr. Nansen, and his lectures inspire one with admiration for the endurance and bravery of the little company. In September, 1893, the vessel became attached to an ice pack, with which it drifted, as Nansen had supposed it would, and by March 14, 1895, a point in latitude 83° 59′ was reached. Thence he and a companion named Johnson proceeded with sledges toward the pole, but the lack of a sufficient number of dogs prevented them from reaching their destination, though they succeeded in making their way to 86° 14′, which they estimated at 261 miles from the North Pole. During the voyage many great hardships were endured, the company subsisting mostly on bear meat, and for the purpose of protection constructed several huts of stone to guard against the effects of remarkable cold. Nansen relates that electric light was furnished during the long and dreary nights by an arc lamp, which was supplied with electricity by a windmill, and during calms by the sailors turning a capstan. A phonograph was utilized to entertain the company, the songs being supplied largely by Mrs. Nansen before the expedition started upon the voyage. Dr. Nansen made several tours through America for the purpose of lecturing on the Arctic region, and in these lectures described in an interesting manner the discoveries made on the Franz-Josef Land Archipelago, including an area of about 50,000 square miles which previously was unknown. His voyage established conclusively the fact that there is no undiscovered continent in the north polar regions.

NANTES (nänts), a city of France, capital of the department of Loire-Inférieure, 210 miles southwest of Paris. It is located on the Loire River, 38 miles from the ocean, and is important as a navigation and railroad city. Nantes is beautifully built of brick and stone. It has well-paved streets, electric lights and street railways, and many interesting buildings. The ducal castle served as a residence of Charles XIII. and several succeeding kings. Its cathedral, founded in 1432, has a monument to the Duke and Duchess of Brittany. Other interesting buildings include the museum of natural history, the museum of paintings, and the public library containing 60,000 volumes. The harbor can easily accommodate 250 vessels, and the river has been improved in such a manner that the largest vessels may reach the city. Among the manufactures are cotton textiles, woolen and silk goods, sugar, chemicals, salt, cordage, optical instruments, furniture, spirituous liquors, sail cloth, machinery, and sailing vessels of all kinds. Nantes has an interesting history as a seat of Gaulish influence before the Roman occupation. It was for many years a possession of the dukes of Brittany, but when Anne of Brittany married Louis XII., in 1499, it, like her other possessions, became merged into France. The Revolution was particularly disastrous to Nantes, since fully 30,000 people were destroyed in the city and in its vicinity. Population, 1906, 133,247; in 1921, 170,535.

NANTES, Edict of, a famous decree signed at Nantes by Henry IV. of France, on April 15, 1598. By this decree religious liberty was granted to the Protestants, who were not only permitted to hold public meetings, but were made eligible to become officeholders under the general government. Under this decree they maintained four theological colleges. However, they were required to pay tithes to the Catholic priests and celebrate the Roman Catholic festivals. Louis XIV. signed a decree revoking the edict on Oct. 18, 1685, in consequence of which France lost fully 400,000 of her most industrious and intelligent citizens. Many of the emigrants settled in Germany, Holland, Switzerland, America, and England.

NANTICOKE (năn′tĭ-kōk), a borough of Pennsylvania, in Luzerne County, on the Susquehanna River, twenty miles southwest of Scranton. It is on the Central of New Jersey and lines of the Pennsylvania railroads, and is surrounded by a productive anthracite coal region. The noteworthy buildings include the high school, the public library, and the townhall. It has manufactures of machinery, ironware, earthenware, and utensils. The place was settled about 1850 and incorporated in 1874. Population, 1900, 12,116; in 1920, 22,614.

NANTUCKET (năn-tŭk′ĕt), a town of Massachusetts, county seat of Nantucket County, on Nantucket Island, 27 miles south of the peninsula of Cape Cod. The island is fifteen miles long and from two to four miles wide, and has an area of 45 square miles. The town is coextensive with the island. It has railroad conveniences, modern municipal facilities, and steamboat communication. Nantucket is noted as a health resort. Cod fishing is the principal industry. It was settled in 1659. Population, 1905, 2,930; in 1925, 3,152.

NAOROJI (nou′rō-jē), **Dadabhai,** public man, born in Bombay, India, Sept. 4, 1825; died July 2, 1917. He studied in public schools and the Elphinstone Institution, and was professor of mathematics and natural philosophy in the latter in 1854. The following year he removed to England, where he was one of the founders of the East Indian Association, in 1867. He became prime minister to the Prince of Baroda in 1874. In 1885 he was elected to the Legislature of Bombay, serving two years, and subsequently served seven years as president of the National Congress of India. From 1892 until 1895 he was a Liberal member of the British House of Commons, being the first Indian member of that body. Besides contributing to current literature, he published "Wants and Means of India" and "Poverty and Un-British Rule in India."

NAPHTALI (năph′ta-lī), the son of Jacob

and Rachel's maid Bilhah, who is known as the head of one of the twelve tribes of Israel. The name Naphtali is defined as meaning "my wrestling." The tribe gave efficient support to the united army of Israel at the time Canaan was invaded. It received a tract of land in the upper part of Galilee, and, when Tiglath-Pileser made an incursion from Assyria, it was carried almost totally into Assyrian captivity. Kadesh was the principal city in its territory.

NAPHTHA (năf'thà), an inflammable oil distilled from organic bodies, such as bituminous shale, asphalt, and coal tar, but principally from petroleum. It is light, volatile, and colorless. Naphtha is employed for a solvent, as in the manufacture of paints and varnishes, and as a burning fluid for illumination. The ancient Egyptians prepared naphtha from bitumen and asphalt for use in their lamps, and to this product the name was limited originally. As the science of chemistry became enlarged the term was applied to a number of inflammable, mobile, and volatile liquids. At present it is extended in its application to any liquid hydrocarbon and natural petroleum, or some of its volatile products. *Caoutchouc naphtha* is obtained by the dry distillation of crude India rubber. *Coal-tar naphtha* is the volatile mixture distilled from coal tar, containing xylene, benzene, and silver-hydrocarbon. *Coal naphtha* is distilled from rich bituminous coal. *Petroleum naphtha* is the more volatile portion of petroleum, which is collected separately during the distillation and placed on the market as crude naphtha, or again separated by distillation into gasoline, benzene, or refined naphtha. *Wood naphtha* is the well-known methyl alcohol and *shale naphtha* is distilled from bituminous shales or schists. Petroleum is found in large quantities in Pennsylvania, Ohio, Canada, China, Russia, and many other regions. It yields about twenty per cent. of naphtha and this is separated into gasoline, benzene, and benzoline. In reducing coal, a tar is obtained which yields about fifteen per cent. of naphtha.

NAPHTHALENE (năf'thà-lēn), a solid crystalline hydrocarbon obtained from coal tar by distillation, but it also occurs naturally as a mineral. It burns with a highly luminous but smoky flame, melts to a clear liquid at 79°, and crystallizes into leafy crystals. A large number of substitution products may be formed by uniting it with chlorine bromine. A hydrocarbon known as *naphthyl* and kindred products are obtained by mixing a quantity of naphthalene with sulphuric acid, manganese, dioxide, and water, and heating it to a high temperature. Naphthyl alcohol is derived from naphthyl. From this product fine yellow dyes are secured for coloring wool, silk, and other textiles fine shades of golden yellow, lemon, and orange.

NAPIER (nā'pĭ-ēr), a town of New Zealand, capital of Hawke's Bay County, on the eastern coast of North Island. It is located on Hawke Bay, about 150 miles northeast of Wellington, with which it is connected by a railway. Among the chief buildings are a townhall, an Anglican cathedral, a museum, and a public library. The exports consist of wool, timber, and fresh and canned meats. Furniture, earthenware, and clothing are manufactured. Population, 1906, 9,876; in 1921, 11,736.

NAPIER (nāp'yĕr), **Sir Charles James,** soldier, born in Whitehall, London, England, Aug. 10, 1782; died near Portsmouth, Aug. 29, 1853. He descended from a distinguished family, became an ensign in the army in 1794, and three years later was made aid-de-camp to Sir James Duff. He served in the regiment which was dispatched to suppress the Irish rebellion and in 1811 volunteered in the Peninsular War, serving at Coa and Busaco, and in the latter place was severely wounded. Shortly after he took part as a British officer in the War of 1812 against the United States. In 1814 he served in the war against Napoleon, taking part in the capture of Cambray, but missing the celebrated engagement at Waterloo. Shortly after he entered the military college at Farnham, where he studied the theories of strategic warfare and engineering. In 1822 he entered upon five years' service as governor of Cephalonia, where he aided in promoting Greek independence. He refused the governorship of Australia in 1834, became major general in 1837, and in 1841 resigned his command and went to India. The following year he received command of the army in Sinde, where he was dispatched to subdue the ameers. On Feb. 17, 1843, he made an attack upon the Baluch army at Miani, which he defeated with 2,500 men against a force of Baluchs numbering 22,000 men. Shortly after Sinde was annexed with Napier as its governor, but, because of differences regarding the presidency of Bombay, he resigned in 1847 and returned to England. Soon after he was again placed in command of the British forces in India, where he rendered efficient military services, but in 1850 returned to England after being reprimanded on a trifling point of discipline. He published "Lights and Shadows of Military Life."

NAPIER, John, mathematician, born near Edinburgh, Scotland, in 1550; died April 4, 1617. He studied at the University of Saint Andrews and subsequently traveled in France, Germany, and Italy. On returning to England, he gave his attention to the construction of machines serviceable in warfare, and invented a mirror to set fire to ships by reflecting the sun's rays. He is celebrated principally for his system of logarithms, which he brought out in 1614. Later he added to the knowledge of trigonometry by formulating the general theorem for the solution of problems which involve the right-angled spherical triangles.

NAPIER, Robert Cornelius, British general, born in Ceylon, Dec. 6, 1810; died in London,

England, Jan. 14, 1890. He secured a military education at Addiscombe, engaged as engineer with the Bengal military forces in 1826, and at the siege of Multan was severely wounded. Later he became chief engineer of the Punjab, in which position he rendered efficient service in planning vast improvements. After the siege of Lucknow, he was knighted and the thanks of Parliament were extended to him in 1858 for service in the Chinese War. In 1868 he commanded an expedition in Abyssinia. For efficient service at Magdala he was created Baron Napier of Magdala and received an annuity of $10,000. He became commander in chief of the Indian military forces in 1870, served as Governor of Gibraltar from 1876 until 1882, and later was field marshal.

NAPIER, Sir William Francis Patrick, soldier and author, brother of Sir Charles, born near Dublin, Ireland, Dec. 17, 1785; died Feb. 12, 1860. In 1800 he became an ensign in the artillery stationed in Ireland. Later he served in Denmark and the peninsular campaign, in which he was dangerously wounded. In 1819 he retired from the army as a lieutenant general and entered upon a brilliant literary career. Among his publications are "History of the War of the Peninsula," "Life of Sir Charles Napier," "Conquest of Sinde," and "Administration of Sinde."

NAPLES (nā'p'lz), the largest city of Italy, on the Bay of Naples, 158 miles southeast of Rome. It occupies a fine site and is famed as a center of industry and commerce. The site is five miles long and three miles wide. Although the variations of temperature are sudden, it has a fine climate. The city has well-improved streets and all the modern facilities that appertain to the general convenience, such as electric lights, street railways, telephones, telegraphs, railroads, and public parks. It has fully 325 churches, many of which possess much beauty in architecture and finish. The Cathedral of Saint Januarius is a structure of great beauty. It contains the tombs of Pope Innocent IV. and Charles of Anjou and is decorated with beautiful statues and paintings. The city has a well-organized and liberally patronized public school system, a number of colleges, hospitals, charitable and benevolent institutions, a zoölogical laboratory, and a fine university founded in 1224. This famous institution has an extensive system of university courses, 5,150 students, and a valuable museum and library.

Naples has manufactures of porcelain, cotton textiles, woölen and silk goods, chemicals, perfumery, musical instruments, glass, soap, spirituous liquors, machinery, engines, vehicles, and ships. The export and import trade is very large, being greatly facilitated on account of the convenient harbor in the Bay of Naples, at which terminate several canals and international railroad lines. In the vicinity of Naples tourists find splendid gardens and vineyards and many ancient ruins, among them remains of Roman temples, tombs, and palaces. Here are many relics from the ancient cities of Pompeii and Herculaneum. The life of Naples is cosmopolitan, owing to the fact that it is visited by tourists at all seasons of the year. It was founded many centuries before the Christian era by the Grecians. The early colonists came from the Grecian town of Cumae and the city was named Neapolis, meaning New City. This name was applied to distinguish it from Parthenope, an adjoining Grecian city. Population, 1922, 698,-405.

NAPLES, Bay of, an inlet from the Mediterranean, on the western coast of Italy. It extends from Capo di Miseno, its northern limit, to Punta della Campanella, its southern limit, a distance of 35 miles. Near its entrance are the islands of Capri, Procida, and Ischia, and just north of it is the celebrated Mount Vesuvius. The natural scenery is remarkable for its beauty. Many destructive earthquakes have made its vicinity famous in history. On its northeastern shore is the city of Naples.

NAPLES, Kingdom of, a former political organization of importance in the history of Europe, which originated from the settlements made by Grecians at Parthenope and Neapolis. The first Greek settlements were founded in the vicinity of the Bay of Naples about the latter part of the 8th century B. C. These colonies rose to power and eminence by reason of the industry and warlike qualities of their inhabitants. They existed for many centuries as municipal or federative governments. Rome conquered Neapolis, the last of the Grecian cities, in 290 B. C., and the laws and customs were modified gradually in accord with those of their conquerors. Pyrrhus and Hannibal were unable to conquer it, but in 82 B. C. it fell under the government of the Sulla party, and during that period much damage was inflicted. In the time of the Roman Empire many of the wealthy people favored the region as a residence, largely on account of the fine climate, the fertile soil, and the literary center then existing at Neapolis. It was seized by Odoacer soon after the decline of the Western Empire, and in 190 A. D. became subject to the Goths. Belisarius took the city of Neapolis in 536. Totila sacked it six years later, but soon after it passed to the Lombards, who erected various independent duchies in the region tributary to it.

The Normans conquered the whole country in the 11th century and combined Naples and Sicily into a tributary kingdom. Soon after the German Hohenstaufen dynasty secured control. Under the administration of the German rulers notable strides of intellectual and social advancement were made, but in 1266 the Hohenstaufen power was subdued by the popes, who made Charles of Anjou sovereign of Naples and united with his kingdom the two Sicilies. Sicily became independent of Naples in 1282, but the

dynasty established by Charles of Anjou governed until 1441, when the Aragon rule succeeded. In the reign of the princes of Aragon, France and Spain contended for supremacy, and in the early part of the 16th century Spanish influence predominated. It was governed more than a hundred years by Spanish viceroys. Masaniello led a well-organized revolt against Spanish supremacy in 1647. In this movement he was assisted by the Duke of Guise, but after the capture of the latter the country again became subject to Spain.

In 1707 Naples passed from Spanish sovereignty to Austria, but in 1735 it was made an independent monarchy with Don Carlos, the founder of the Bourbon dynasty, as sovereign. Ferdinand IV., son of Don Carlos, succeeded his father as king when that sovereign became King of Spain, in 1759, and in 1798 Naples was formed into a republic under the influence of Republicans from France, but soon afterward the king was restored by royalists. A French army of invasion entered Naples in 1806, when it was conquered and Napoleon proclaimed his brother Joseph king. Two years later Joseph was removed to Spain and his brother-in-law, Joachim Murat, ascended the throne of Naples. Murat was defeated in 1815 by Ferdinand, who executed the king and proclaimed himself Ferdinand I. He died in 1825, being succeeded by Francis I., and, when that sovereign died, in 1830, his son became king as Ferdinand II. The latter died in 1859 and was succeeded by Francis II. In 1860 the revolution under the leadership of Garibaldi attained success in opposing the Bourbon government, and in 1861 both Naples and Sicily were incorporated with the kingdom of Italy.

NAPOLEON (nȧ-pō'lē-ŭn), **Victor Jerome Frederick,** claimant to the throne of France, born July 18, 1862. He descended directly from the Napoleon family, was by the will of his father, Prince Napoleon, made the prince imperial, and in 1886 was obliged to leave France by an expulsion act. After 1891 he became recognized as the head of the Napoleon family and of the Bonapartist party.

NAPOLEON I., Emperor of the French, born at Ajaccio, in the island of Corsica, Aug. 15, 1769; died on the island of Saint Helena, May 5, 1821. His father, Charles Bonaparte, was an advocate and his mother's name was Letizia Ramolino. He enrolled at the military school at Brienne as a pensioner of the king in 1779, where he remained a little more than five years. Shortly after he entered the military school of Paris, where he received a commission as lieutenant of artillery in 1785. He was located in a garrison at Valence when the French Revolution began, and soon after made an unsuccessful attempt to conquer the Corsican cities for France. In 1793 he was made lieutenant colonel of artillery, and shortly after succeeded in capturing Toulon from the British, a successful strategic achievement that caused him to be made brigadier general of artillery in February, 1794. He was planning, in 1795, to engage for military service with the Sultan of Turkey, but in the early part of that year the convention was thrown into great peril by the mutinous spirit of a large number of people at Paris, and Napoleon was finally selected as the most available man to command the national forces. A force of the national guard numbering 30,000 men undertook to reach the convention at the Tuileries, but Napoleon provided for its defense with 5,000 troops. He placed his forces in line and sent a destructive volley of grape shot to clear the streets, mowing down those engaged in the mutiny with great destruction, and not only disbanded the national guard, but ended the insurrection by disarming the populace.

NAPOLEON BONAPARTE.

Immediately he was given command of the army of the interior. On March 9, 1796, he was married to Josephine Beauharnais, the widow of General Beauharnais. Soon after he assumed supreme command of the army of Italy, which he found in a wretched condition, but his tact was equal to the task of organizing and providing an adequate force. Although the French forces numbered but 40,000 men, he was confronted by a force of 75,000 Austrians and Sardinians. On April 11, 1796, he succeeded in securing possession of the Apennines by defeating the Austrians at Montenotte, and soon after followed successful battles that concluded at Lodi on May 10, thereby bringing all of northern Italy into possession of the French. He immediately began to move upon Austria, and that country was compelled to make peace after its army was defeated at Bassano, Roveredo, Rivoli, and other points. These successes required the Pope to cede a portion of his dominion. They brought about peace treaties with Modena, Parma, and Naples, while the treaty with Austria, on Oct. 17, 1797, gave Lombardy, the Netherlands, and the Ionian Islands to France, and Venetia was made a part of Austria.

Napoleon returned in December, 1797, to France, where he was greeted as a hero and as the most celebrated military leader of the world. The Directory began to fear his power and decided to have him take charge of an expedition to Africa for the purpose of conquering that country and destroying the power of England in that region. Accordingly he embarked in May, 1798, with a well-organized army from Toulon, reduced Malta while en route, and on July 1 effected a landing at Alexandria. On July 4 he reduced that city, on the 24th of the

(Opp. 1894) NAPOLEON DIVORCING JOSEPHINE

same month he captured Cairo by winning the Battle of the Pyramids, and subsequently overran Egypt and much of Palestine. He was everywhere victorious except at Acre, and his fleet was destroyed in the Bay of Aboukir by Nelson. It was now his ambition to overthrow the Turkish power, but he was attacked by a large force of Turks that landed at Aboukir on July 25. This attack was skillfully repelled and the Turks were almost annihilated. Soon after intelligence reached him that the army of France was meeting with disaster at home, which caused him to give the command of the army in Egypt to General Kleber and he returned to France.

The government of France had been unsuccessful in satisfying the people, and Napoleon was hailed as the right man to restore order and confidence. After securing the coöperation of Moreau and other military men of influence, he abolished the Directory on Nov. 9, 1799, and caused the adoption of a new constitution. This constitution provided for three consuls, of which Napoleon was the first consul; Cambacéres, the second; and Lebrun, the third. However, Napoleon was the real ruler of France, and he and Josephine occupied the palace of the kings of France in the Tuileries. His government gave vigorous attention to both military and civil affairs, and, after constructing canals and highways and reorganizing the army, he decided to humble the pride of Austria. In 1800 he marched into Italy by way of the Great Saint Bernard pass, shortly after defeated the Austrians at Marengo, won the Battle of Hohenlinden through the skillful coöperation of Moreau, and by the Peace of Luneville acquired all of Italy. Subsequently treaties were made with Portugal, Spain, Bavaria, Naples, Turkey, and Russia, and in 1802 Great Britain agreed to the Treaty of Amiens. His attention was next directed to the enlargement of civil institutions. Accordingly he reformed local government, established schools, revised the code of laws, founded the Bank of France, established universities, defined the powers of the church, and gave encouragement to the development of industrial arts and sciences. The senate in 1802 proclaimed him consul for life and in May, 1804, he proclaimed himself emperor, being crowned with Josephine as empress in Paris, Dec. 2, 1804. The people gave a decided vote in favor of this action. Immediately he established titles of nobility, created military marshals, and instituted an imperial court.

Napoleon was crowned King of Italy at Milan on May 26, 1805, and his stepson, Eugene Beauharnais, became his viceroy. This course and his policy in annexing large territories to his dominion caused his power to be feared by the European states, and soon after an alliance was formed against him by Russia, Austria, Sweden, and England. Napoleon immediately invaded Germany, where he defeated a large Austrian army at Ulm, captured Vienna, and on Dec. 2, 1805, won the Battle of Austerlitz over the Austrians and Russians. These successes were followed by making his brother Joseph King of Naples; his brother Louis King of Holland; and the electors of Bavaria and Württemburg, who had rallied to his assistance, kings of their respective countries. A large army of Prussians and Russians had in the meantime gathered at Jena, which Napoleon defeated, and, after capturing Berlin, he established the kingdom of Westphalia for his brother Jérôme. In June, 1807, Napoleon defeated the Russians at Friedland and shortly after a compact was formed between him and Emperor Alexander I., by which Russia was allowed to take Finland from Sweden and annex a portion of Prussian Poland, while the King of Prussia received as a possession one-half of his former dominions.

It was Napoleon's ambition to humble England, an object he hoped to accomplish by closing the principal ports of Europe against that country, but the English army defeated his forces in Portugal. He sent an army against the allied Portuguese and English in 1807, which resulted in the royal family of Portugal settling in the then Portuguese colony of Brazil, and the following year his brother Joseph was made King of Spain, while his brother-in-law, Murat, succeeded to the throne of Naples. The French were finally driven from Spain by the allied army of English and Spaniards, this being known as the Peninsular War and extending over a period of seven years. Austria declared war against Napoleon in 1809, which caused him to enter Bavaria with a large army, but he met defeat at Aspern and Esslingen. However, on July 6 the final battle was fought at Wagram, in which the opposing forces were crushed completely, and as a result Emperor Francis was compelled to cede more of his territory. Napoleon's accomplished wife, Josephine, had borne him no children, hence he divorced her, and on April 2, 1810, married Maria Louisa of Austria. From this union came a son in 1811, who is known as Napoleon II.

Napoleon was in the height of his power in 1810 and 1811, his dominion extending from Hamburg to the Mediterranean and from Vienna to the Atlantic, but his influence began to decline rapidly. He declared war against Russia in 1812 because the Czar found it impossible to maintain a continental blockade, and with an army of 550,000 men entered upon his celebrated invasion of Russian territory. The Russians made a stand at Borodino, but were defeated, and by a skillful retreat avoided engagements. They not only fell back with great precision, but destroyed or carried away all available supplies. This course made it exceedingly difficult for Napoleon to gather support for his immense army, and when he reached Moscow the city had been reduced to ashes. The winter setting in made it impossible to continue farther pursuit, neither could he subsist at Moscow, and

the only thing that remained was an inglorious retreat.

No sooner had Napoleon decided upon this course than extremely severe weather set in. The Russians took advantage of his dilemma by pursuing him with companies of mounted Cossacks, who harassed his army and destroyed in great numbers the French soldiers, now fatigued and weakened by famine and disease. Not more than 50,000 of his army lived to return, but he immediately ordered a conscription and raised an army of 350,000 men. However, the military spirit of Europe was at its height. In 1812 the notable defensive alliance was formed by Prussia, Spain, Russia, Great Britain, and Sweden, but the first decisive battle at Lützen, on May 2, 1813, terminated in a victory for Napoleon. All the powers of Europe were now upon him with a force of 400,000 men, but he defeated them at Bautzen and Dresden. Napoleon's retreat to Leipsic became necessary, where he was defeated in the famous "Battle of Nations" on Oct. 16, 18, and 19. In the early part of 1814 he was ready with a new army and defeated Blücher in four successive engagements, but the allied armies captured Paris on March 30, 1814, and Napoleon proposed to abdicate in favor of his son. This proposition was not accepted, since the allies looked upon him as a disturber of the peace in Europe, and on April 5 he abdicated unconditionally at Fontainebleau. He retained the title of emperor, was given the sovereignty of the island of Elba, and Louis XVIII. was restored to the throne of France.

Napoleon was not to be so easily disposed of and, taking advantage of the unpopularity of the Bourbons in France, he escaped from Elba after ten months' residence and landed, on March 1, 1815, at Frejus. There he was received with much rejoicing by the army and immediately began a triumphant march upon Paris. Louis XVIII. fled, while his place was taken by Napoleon, who began at once to raise a powerful army with which to confront the consolidated forces of Europe. The allied armies began an immediate march upon France, but Napoleon planned to defeat them one by one before they could unite. The German army under Blücher was defeated at Ligny on June 16, and Wellington was attacked at Waterloo on the 18th, to which place he had retired. Napoleon was on the verge of success against the English army, but the Prussians under Blücher made a sudden and decisive attack from the rear, and thus the great Battle of Waterloo was lost. The allied armies occupied Paris without opposition, and Napoleon abdicated in favor of his son on June 22. He found it impossible to escape from France, and accordingly surrendered to Captain Maitland of a British man-of-war. Louis XVIII. was immediately restored to the throne and Napoleon was confined on the island of Saint Helena, where he remained a prisoner under the charge of Sir Hudson Lowe. He was bewildered the last few days of his life, his last words being "head of the army," from which it is taken that he thought himself still in command of his troops. He was buried on the island, but twenty years later the remains were removed to France, where they were placed in a magnificent tomb in the Hôtel des Invalides on Dec. 15, 1840.

NAPOLEON II., only son of Napoleon I. and Maria Louisa, born in Paris, France, March 20, 1811; died in Schönbrunn, Austria, July 22, 1832. The title of King of Rome was given him at birth. When his father abdicated, he and his mother retired to Vienna, where he was made an Austrian prince by the Emperor of Austria with the title of Duke of Reichstadt. He received a careful education, was made lieutenant colonel in 1831, and commanded a regiment in Vienna. The title of Napoleon II. was not assumed by him, but this he acquired when Napoleon III. was recognized, in 1852, by the European governments.

NAPOLEON III., Charles Louis Napoleon Bonaparte, Emperor of France, born in Paris, April 20, 1808; died at Chiselhurst, England, Jan. 9, 1873. He was the nephew of Napoleon I., being the youngest son of Louis Bonaparte, King of Holland, who was a brother of the former. Hortense Beauharnais was his mother, under whose charge he was carefully trained in early childhood, but most of his early life was spent in Germany and Switzerland. In 1832 he became the heir to the imperial throne of France by the death of Napoleon II., and until 1836 his life was spent principally as a student and author. In the latter year he resolved to make an effort to secure the throne of France by overthrowing Louis Philippe, and accordingly attempted to come into possession of the garrison at Strassburg. His ambition was not only a failure, but he was captured and sent to America. After remaining some time in Brazil and New York, he returned to Switzerland, from which country the French government sought to have him expelled, but in 1840 he made a second attempt to become the imperial ruler of France. This time he landed from England at Boulogne, where he was placed under arrest, and after a formal trial was sentenced to life imprisonment in the fortress of Ham. While there he engaged in literary work, and edited "The French Dictionary of Conversation." On May 25, 1846, he disguised himself as a workingman and escaped to England.

When the Revolution of 1848 broke out, Napoleon returned to France, where he became a member of the National Assembly, and when the republic was instituted he was made its president for four years, 5,434,226 votes being cast in his favor out of a total of 7,500,000. In the latter part of 1851 he declared Paris in a state of siege and issued a decree to dissolve the National Assembly. He caused the arrest of many opponents to his designs, and any one

disposed to oppose him publicly on the streets was ordered shot down by the military forces. In December of the same year he issued a second decree, in which the presidential term was extended to ten years and universal suffrage was established. On the 20th of the month an election was held in which nearly a unanimous vote was cast in favor of making him president for ten years, and immediately he began to plan for a restoration of the empire. The national guard was reëstablished in 1852 and a revised constitution was adopted. On Dec. 1, 1852, he was proclaimed emperor with the title of Napoleon III. He married a Spanish lady, Eugénie Marie de Montijo, Countess of Peba, on Jan. 29, 1853, who made his court one of much brilliance and fashion. His foreign policy at once became vigorous, and in 1854 he joined England in declaring war against Russia in the interest of Turkey. This conflict, known as the Crimean War, ended with Russian defeat in 1856. In 1859 Napoleon took up arms against Austria to free Italy, but, after winning victories at Magenta and Solferino, the Peace of Villafranca was concluded. By its terms Austria ceded Lombardy to Italy and France secured the provinces of Nice and Savoy. France joined with Spain and England in 1862 for the purpose of requiring Mexico to redress injuries, but the two allies soon withdrew and Napoleon conquered the country with his own forces and made Maximilian, Archduke of Austria, its emperor. When Napoleon withdrew his army, in 1867, Maximilian was made a prisoner and was executed.

The successful war prosecuted by Prussia against Austria in 1866 excited the jealousy of Napoleon, and he sought to interfere with the establishment of boundary lines. When Spain invited Prince Leopold of the German house of Hohenzollern to become the Spanish king, he made it a pretense to declare war against Prussia, in 1870. He assumed chief command of the French army on July 28, 1870, but on September 2 was compelled to surrender at Sedan and was taken as a prisoner of war to Germany. The French army was unsuccessful in every battle before the remarkable enthusiasm of the imperial forces of the German Confederation, and the power of Napoleon ended with his capture. Empress Eugénie fled to England two days after the surrender, while Napoleon was kept a prisoner of war at Wilhelmshöhe until peace was declared, when he joined the ex-empress at Chiselhurst. His only child, the prince imperial of France, was born in Paris, March 16, 1856, and on June 1, 1879, was slain in a battle against the Zulus in South Africa. He was educated in Belgium and England, and in 1879 joined the English military forces in South Africa. He is often mentioned by his imperial title, Napoleon IV.

NARBONNE (när-bŏn′), a city of France, in the department of Aude, 92 miles southeast of Toulouse. It is located about six miles from the Mediterranean and has railway connections with the principal cities of France. The streets in the older part are narrow and crooked, but the newer quarters are well improved. The Church of Saint Just, a Gothic structure, is an imposing building with towers 194 feet high. Other buildings include the theater, a museum, and several schools. The manufactures consist principally of leather, pottery, verdigris, and machinery. It has a large trade in salt, grain, and wine. Narbonne was founded by the Romans in 116 B. C., when it was known as Narbo. The Visigoths captured it in the 5th century, and later it passed to the Saracens. It has been a possession of France since 1467. Population, 1922, 28,852.

NARCISSUS (när-sĭs′sŭs), a beautiful youth mentioned in Greek mythology, described as the son of the river god Cephissus. It is related that Echo fell in love with him, but he failed to return her affection, on account of which she was so grieved that she gradually pined away until she became a mere shadow of her former self, and at length nothing remained of her except her voice, which henceforth gave back with true fidelity every sound that was uttered in the hills and vales. Narcissus was punished by Aphrodite, who caused him to fall in love with his own image, which he beheld while looking at a fountain. His unrequited love caused him to waste away. Subsequently the gods changed him into the flower that bears his name.

NARCISSUS, a genus of popular flowering plants, most of which are native to Europe, but many of them have been widely naturalized and greatly improved by cultivation. The plants are bulbous, the stems are rushlike, the flowers are bell-shaped, and the fruit is formed like capsules with globose seeds. Among the favorite species are those known as daffodils, jonquils, white narcissus, and polyanthus narcissus, these and others being cultivated extensively in gardens for ornamental purposes. The fragrance is admired. Perfumes made of the flowers are used in India for headache.

NARCISSUS.

Large quantities of narcissus are marketed in early spring by gardeners located near New York and other large cities.

NARCOTIC (när-kŏt'ĭk), a substance that relieves pain and produces sleep, if administered in small doses, by diminishing nervous action. When given in moderate doses most narcotics have a stimulating effect, but in large quantities they produce stupor, coma, and convulsions, and in excessive doses cause death. In medical use narcotics produce narcotism; that is, they bring the system under the influence of narcotics. The employment of these substances, if long continued, causes *narcosis,* an exaggerated effect or influence of the continuous use of narcotic substances. Among the different substances classed as narcotics are tobacco, alcohol, camphor, opium, belladonna, hemlock, aconite, digitalis, henbane, and many others.

NARRAGANSETT BAY (năr-rà-găn'sĕt), an inlet from the Atlantic Ocean, extending a distance of 28 miles into Rhode Island. Its upper part is known as Providence Bay. The bay is from three to twelve miles wide, is well guarded by lighthouses, and contains a number of beautiful islands, among them Prudence, Rhode Island, and Conanicut. Among the rivers that flow into the bay are Pawtuxet, Providence, Taunton, and Pawtucket.

NARRAGANSETTS, an Indian tribe of the Algonquin family, formerly found in the regions of Rhode Island which extend along the west shore of Narragansett Bay. They were generally more peaceable than most of the Indians of New England. In 1636 Roger Williams found a safe refuge among them, and exercised considerable influence in maintaining peaceable relations between them and the colonists. They ceded their land to the English in 1644, but in the latter part of the 17th century several difficulties arose, and at the time of King Philip's War they were suspected and attacked by the whites. In the hostilities that followed the tribe was almost annihilated. At present they number about 150, many having been assimilated by the whites. This small remnant occupies a reservation at Charlestown, R. I., but tribal relations have not been maintained since 1880. Many of the Narragansetts have become highly skilled as artisans, and have adopted the habits and language of the whites.

NARSES (när'sēs), eminent Roman soldier and statesman, born in Persian Armenia about 473 A. D.; died in Rome about 568. He was of obscure parentage, became a slave in childhood, and in 538 secured the favor of Emperor Justinian, who appointed him keeper of the privy purse. Soon after he was given a military command in Italy, where he defeated the Goths in several encounters. At Taginae he engaged the Ostrogoths in battle, in which his opponents were defeated and their king, Totila, was slain. Through his successful campaigning the entire Italian peninsula came into possession of the Romans, and he was made prefect of Italy with his seat of government at Ravenna. After the death of Justinian, he was charged with extortion and avarice, and was removed from office by Emperor Justinius II. in 567.

NARVÁEZ (när-vä'ăth), **Panfilo de,** explorer, born in Valladolid, Spain, about 1470; died in 1528. He immigrated to America in 1498 and served with Velasquez in the conquest of Cuba, where he settled permanently. In 1520 he was sent to Mexico to imprison Cortes, who had become an antagonist of Velasquez, but was himself captured. Soon after he was released and went to Spain, where he received a grant to Florida. In 1528 he landed at Apalachee Bay and marched inland, but was betrayed by the Indian guides and was obliged to return. He and nearly all his men perished, only four survivors reaching Mexico several years later.

NARVÁEZ, Ramón Maria, statesman, born at Loja, Spain, Aug. 4, 1800; died April 23, 1868. He entered the army when a youth and by bravery won rapid promotion. In 1839 he took part in an insurrection at Seville, where the opponents of Espartero were defeated, and he was compelled to flee to France for safety. In 1843 he took charge of an army in the interest of Maria Christina, with which he overthrew the government of Espartero. The following year he was made prime minister and later became field marshal. Soon after he was created Duke of Valencia by Queen Isabella. In 1846 he resigned his post as prime minister, but was reinstated the following year. Later he was ambassador to Vienna, and subsequently served as prime minister several times.

NARWHAL (när'hwăl), a mammal which is native to the northern seas. It is frequently called sea unicorn, or unicorn whale, because the male has a horn from six to ten feet long extending from the upper jaw. The horn is formed by an enlargement of one of the teeth of the upper jaw, usually the left tusk, though the right is sometimes developed. It is twisted spirally and grooved, and is pointed straight forward. The tusk is formed of ivory like the tusk of an elephant, growing from a permanent pulp. It is sometimes found in the female. The narwhal attains a length of from fifteen to twenty feet. It is whitish in color with gray or darker spots, and has no dorsal fin. The female has no true teeth. The narwhal is found in large numbers in the vicinity of the 80th parallel north latitude, where it feeds principally on mollusca. It yields an oil more valuable than that of the common whale. Its skin is of use in the manufacture of various articles. The ivory of the tusk is hard and white and takes a high polish. See illustration on following page.

NASBY (năz'bĭ), **Petroleum V.** See **Locke.**

NASEBY (nāz'bĭ), a village of England, in Northamptonshire, twelve miles east of Rugby. It is celebrated for the Battle of Naseby, which was fought here on June 14, 1645, in the Civil

War between Charles I. and the Parliamentary army under Fairfax and Cromwell. The former had 7,500 and the latter had 14,000 men. The Royalists were defeated with heavy losses.

NASHUA (năsh'ū-à), a city of New Hampshire, the county seat of Hillsboro County, on the Merrimac and Nashua rivers, about forty miles northwest of Boston. It is on the Boston and Maine Railroad and has communication by several electric railways. The noteworthy buildings include the public library, the United States Fish Hatchery, the high school, and the Saint Francis Xavier church. Among the manufactures are cotton and woolen goods, paper, hardware, metal products, earthenware, machinery, refrigerators, engines, and vehicles. An abundance of water power is obtained from the Nashua River. It was settled in 1655 and incorporated as a city in 1853. Population, 1900, 23,898; in 1920, 28,379.

NASHVILLE (năsh'vĭl), a city of Tennessee, capital of the State and of Davidson County, on the Cumberland River, about 185 miles southwest of Louisville, Ky. It is on the Louisville and Nashville, the Tennessee Central, and the Nashville, Chattanooga and Saint Louis railroads. The city has an area of 22 square miles. The streets are regularly platted and paved, largely with brick and macadam. The State Capitol, located on the summit of Cedar Hill, was erected at a cost of $1,550,000. In its vicinity are the tomb of James K. Polk, President of the United States, and a statue of Andrew Jackson. Other buildings of note include the Union depot, the city hall, the county courthouse, the Federal building, the War Memorial Building, and numerous business and office buildings.

Nashville is noted as an educational center, having fine public schools and many institutions of higher learning. It has the George Peabody College for Teachers, the Vanderbilt University, the Scarritt College for Christian Workers, the Trevecca College, the David Lipscomb College, the Saint Cecelia Academy, and the Belmont College. Among the industrial and charitable institutions are the State lunatic asylum, the Tennessee Industrial School, the Tennessee School for the Blind, and the State penitentiary. Watkins Institute contains the collections of the State Historical societies. It has a Carnegie library, the Howard library, and the State library. About ten miles east of the city is the Hermitage, the home of Andrew Jackson. North of the city is a national cemetery, containing about 16,750 graves.

Nashville is noted as a commercial and manufacturing center. It is a distributing point for a large section of country, hence has an extensive wholesale and jobbing trade. The manufactures include flour, timber products, fertilizers, confectionery, machinery, farming implements, tobacco and clothing. An extensive electric street railway system supplies communication with many urban and interurban points. It is lighted by gas and electricity, has an extensive sewer system, and maintains waterworks and an efficient fire department.

The first settlement on the site of Nashville was made in 1780, when James Robertson and a company of pioneers located here. It was named Nashborough in honor of Abner Nash, Governor of North Carolina, but it was incorporated under its present name in 1784. The city charter dates from 1806. It became the permanent State capital in 1843. The Federals occupied it in 1862, and two years later it was the scene of an important battle. Its growth has been rapid the past two decades, both in population and wealth. Population, 1900, 80,865; in 1920, 118,342.

NARWHAL.

NASHVILLE, Battle of, an engagement of the Civil War, fought at Nashville, Tenn., on Dec. 15 and 16, 1864. General Thomas occupied Nashville with 56,000 Federals, having been sent there to defend Tennessee. General Hood arrived with 40,000 Confederates on Dec. 2 and took a position on Montgomery Hill, but storms prevented fighting for two weeks. On Dec. 15 Steedman attacked the Confederates on the right and Smith and Wilson advanced against their left. The next day a combined attack was made against Montgomery Hill and along the entire Confederate line, when both sides lost heavily and the Federals withdrew temporarily. Another assault by Smith and Schofield won the day for the Federals. General Hood retreated across the Tennessee River and asked to be relieved from the command. Both sides lost heavily, the Federals about 3,050 men and the Confederates somewhat more.

NASHVILLE, University of, an institution of higher learning at Nashville, Tenn. It was founded by the State of North Carolina in 1785

as Davidson Academy, but was afterward changed to Cumberland College, and in 1826 was reorganized under the above name. During the Civil War it was closed, but it was reopened in 1875, when the trustees and the trustees of the Peabody Fund established a teachers' training school. Later a practice school, a preparatory department, and a collegiate department were added to it. In 1903 it was chartered as the George Peabody College for Teachers, when it received very large endowments. It has a faculty of 145 professors and teachers. The enrollment averages about 3,250 students.

NASMYTH (nā'smĭth), **James,** engineer and inventor, born in Edinburgh, Scotland, Aug. 19, 1808; died in London, May 7, 1890. He secured the early part of his education in the public schools, later entered the High School of Arts, and completed his training at the Edinburgh University. He settled in London in 1828, where he secured employment as an engineer, and in 1832 established himself as an engineer in Manchester. His most important invention was completed in 1839, when he finished the construction of the steam hammer, which he patented in 1842. His other inventions include a steam pile driver and a safety foundry ladle. Nasmyth secured a reputation as astronomer and author. He published "The Moon" and "Remarks on Tools and Machinery."

NASR-ED-DEN (nä-s'r-ĕd-dĕn'), Shah of Persia, born April 4, 1829; assassinated May 1, 1896. He became the ruling sovereign of Persia on Sept. 10, 1848, succeeding his father, Huhammad. When the Turkish and Russian war began, in 1853, he declared neutrality, but later sided with Russia. He traveled extensively in Europe and became distinguished because of his liberality in favoring the establishment of telegraphic communications and other modern institutions. His reign was prosperous and successful, but he was assassinated because of jealousy of persons who desired to hold official position.

NAST (nåst), **Thomas,** caricaturist, born in Landau, Germany, Sept. 27, 1840; died Dec. 7, 1902. He came to the United States in 1846, began the study of drawing at an early age, and when fifteen years old was employed on *Frank Leslie's Illustrated Newspaper* as a draftsman. The publishers of the New York *Illustrated News* sent him as special artist to England in 1860, and later he went to Italy for the purpose of sketching from the military movements of Garibaldi for the illustrated papers of New York, Paris, and London. In 1861 he came to the United States to draw war sketches for *Harper's Weekly.* Subsequently he settled in New York as an artist, producing many popular drawings of a political character. While in this work he invented the popular allegories known as the *Tammany Tiger* and the *Republican Elephant.* After 1885 he spent much time lecturing on crayon drawing. Among the works illustrated by him are Nasby's "Swinging Round the Cerkle," Dickens' "Pickwick Papers," Nast's "Illustrated Almanac," and Dickens' "Pictures from Italy." In 1902 he was appointed United States consul general at Guayaquil, Ecuador.

THOMAS NAST.

NASTURTIUM (năs-tûr'shŭm), a genus of aquatic herbs of the mustard family, known generally as the water cresses. The leaves in most species are pinnate, the flowers are yellow or white, and the seeds are borne in a marginless pod in which they are arranged in two irregular rows. A species known as the *garden nasturtium* has a stem about eight feet long and is

NASTURTIUM.

cultivated as a climbing annual. The name is applied also to a number of species of climbing plants of the geranium family, with which is included the *Indian cress.* Many species are cultivated for their handsome spurred flowers, which are of various colors, but usually crimson, scarlet, orange, yellow, or spotted. The fruit and flower buds have a pungent aromatic flavor and are pickled in vinegar, while the tender shoots are used as a salad. Some species grow from cuttings, but several kinds are raised from the seed.

NATAL (nà-täl'), a possession of Great Britain, on the eastern coast of South Africa, bounded by the Transvaal Colony, Portuguese East Africa, the Indian Ocean, Cape Colony, Basutoland, and the Orange River Colony. Including Zululand, it has an area of 35,371 square miles. The seacoast, which is quite regular, has few harbors, the one at Durban being the most important. Much of the soil is fertile, especially for a distance of about fifty miles inland, and along the western boundary are extensive ranges of the Drakensberg Mountains. These highlands have an altitude of 9,000 feet, but several peaks are higher, including Montague aux Sources, which is 11,165 feet above the sea. Numerous rivers supply drainage, among them the Umtamvuna, the Tugela, the Umlaze, and

their tributaries. The agricultural products embrace tobacco, coffee, sugar cane, oats, cotton, corn, wheat, and tea. Valuable forests extend along the tablelands of the western part and yield excellent lumber. The mineral products include limestone, coal, gold, marble, ironstone, and mineral oil.

As a whole, the climate is not only favorable to the production of fruit, vegetables, and cereals, but is agreeable and healthful. Among the domestic animals are cattle, horses, swine, and poultry. Many wild animals are still found in the newer portions, among them antelopes, hyenas, leopards, lions, ant-bears, jackals, porcupines, and many species of birds. The average temperature is about 65° and the rainfall is 34 inches, but occasionally droughts occur. Locusts and the rinderpest sometimes cause much damage. The export and import trade is chiefly with Great Britain. About 1,200 miles of railway lines have been constructed and others are projected. Common and high schools have been established by government grants. Missionary stations are maintained by a number of American and European societies. Considerable progress has been made both in educational and industrial arts among the natives.

The legislative authority is vested in a Governor, who is chosen by the electors and assisted by a Council and an Assembly. Members of the Council are appointed by the Governor, and members of the legislature are chosen by the people at public elections. General executive authority is exercised by the Governor, who is assisted by a State Secretary, Minister of Education, Premier, Attorney-General, State Treasurer, Minister of Public Affairs, and Minister of Public Work. A colonial judiciary is maintained. The government maintains a system of schools for the native inhabitants and grants aid to higher and industrial schools. Durban is the largest city and has direct railroad connections with interior points and with Pietermaritzburg. Other cities of note include Richmond, Verulam, Graytown, Harding, and Newcastle.

Vasco da Gama discovered the southeastern coast of Africa in 1497 and named the region Terra Natalis. The first settlements were made by the Dutch in 1720, but they proved a failure because of the hostilities of the natives. Many Boers left Cape Colony in 1836, after it became a British possession. They founded a permanent settlement at Port Natal, now called Durban, in 1839, and established an independent republic with Port Natal as its seat of influence. Later the capital was transferred to Pietermaritzburg, where it still remains. The British considered the existence of the republic incompatible with their interests. Hence, in 1843, they entered upon a campaign of conquest and the following year annexed it to Cape Colony, but in 1856 it was made a separate colony. Many conflicts took place between the Boers and British at different times, but the colony was maintained throughout the period. The Boers of the Transvaal entered the colony in 1881 and defeated the British at Majuba Hill. In 1910 it was joined with Cape Colony, Transvaal, and Orange Free State to form the Union of South Africa. Population, 1921, 1,194,958.

NATALIE (nä-tä-lē'), Queen of Servia, born May 2, 1859. She was a daughter of a Russian army officer, received a thorough education, and in 1875 married Prince Milan, afterward Milan I. of Servia. In 1888 she was divorced by her husband and the validity of the divorce was sustained by the Synod. Her husband abdicated the following year and was succeeded by her son, Alexander I., but she left the country when requested to do so by the national assembly in the interest of internal harmony. She became reconciled with her husband in 1893 and was restored by a decree as a member of the royal family, and returned to Belgrade in 1895. In 1903, after the assassination of Alexander I., she was exiled and forbidden residence in Servia.

NATCHEZ (năch'ĕz), a city and port of entry in Mississippi, county seat of Adams County, on the Mississippi River, 100 miles southwest of Jackson. It is on the Yazoo and Mississippi Valley and the Orleans and Northwestern railroads and has regular communication by steamboats. The site consists of the river front, which has the principal business and shipping houses, and a bluff about 200 feet above the river, where the most costly residences are located. It is noted as an extensive cotton and produce market. Among the manufactures are cotton goods, clothing, ice, ironware, tobacco products, and machinery. The city has good municipal facilities, including pavements, electric lights, waterworks, and street railways. Among the chief buildings are the county courthouse, the Jewish synagogue, the Roman Catholic cathedral, the Fisk library, the Jefferson Military School, the Natchez Institute, and the Natchez Hotel. Near the limits is a national cemetery with 3,159 graves. The city was first settled by the French in 1716. It was the scene of a massacre by the Indians in 1849. In 1862 it was captured for the Federals by Admiral Farragut. Population, 1900, 12,210; in 1921, 12,608.

NATICK (nā'tĭk), a town of Middlesex County, Massachusetts, on the Charles River, sixteen miles southwest of Boston. It is on the Boston and Albany Railroad and several electric railway lines. The noteworthy buildings include the Bacon Public Library, the Walnut Hill School, the Morse Institute, and the townhall. It has manufactures of shoes, candy, bread, baseballs, furniture, toys, woodenware, and clothing. John Eliot, the Indian apostle, secured a grant of the land now occupied by Natick and until 1721 the community had a constitution modeled after Exodus xviii. The town was incorporated in 1781. Population, 1925, 12,871.

NATIONAL ACADEMY OF DESIGN, a society of painters and sculptors in New York City, founded in 1825, originally called the New York Drawing Association. The present name was adopted in 1828, when Prof. S. F. B. Morse (q. v.) was elected the first president. At that time the society had 30 members, made up exclusively of artists, but at present the membership is about 200. Besides these are a number of honorary members and fellows. It holds annual exhibitions, at which certain prizes are awarded for meritorious productions. The society maintains a school of design in painting, etching, and engraving, at which about 300 pupils attend.

NATIONAL ACADEMY OF SCIENCES, an institution incorporated in 1863 under an act of Congress, the purpose being to investigate and report on any subject of art or science. Until 1870 the membership was limited to 50, but since that year it has been constituted of not more than 250. Six groups of members are recognized, styled committees, including those on chemistry, biology, anthropology, geology and paleontology, physics and engineering, and mathematics and astronomy. The institution holds two meetings annually, at which prizes and medals are awarded to those who add to knowledge by original research in the departments to which they belong. Reports of the work done by the organization are made at the request of any department of the United States government.

NATIONAL CIVIC FEDERATION, an organization whose purpose is to promote peace and harmony in the industries, especially in regard to capital and labor. It was formed in New York City in 1901, when a number of prominent representatives of labor and capital held a convention and created a commission with the view of checking labor disputes, either by timely meditation or by formal arbitration. Among the representative men at the meeting were John Mitchell, Samuel Gompers, Grover Cleveland, Mark Hanna, Charles W. Eliot, Archbishop Ireland, and John D. Rockefeller. This organization has prevented many strikes and has been instrumental in settling a number of labor disputes, including the great anthracite coal strikes of 1902 and 1925.

NATIONAL DEBT, the whole amount of money that a national government has stipulated to pay, whether the payments are to be made to other governments, to corporations, or to individuals. A national debt is now an institution of all civilized countries. The ability to contract such a debt depends principally upon the stability of the government, its natural resources, its means of military defense, and its various industries. Usually a national debt is created as a means to carry on military operations or commercial enterprises. The creation of such an obligation does not depend so much upon the ability of the nation to repay the money as it does to provide sufficient revenue to pay the interest, and to keep the principal within a reasonable limit as compared to the intelligence and natural resources of the country. Besides, a nation is the sole judge of its own solvency. It may not only repudiate its debts, but even during entire solvency the original obligations upon which the money was borrowed may be materially changed by its legislative authority. However, recklessness on the part of a nation has the same effect as in an individual and, as a result of injudicious financiering, its credit may be destroyed and its power to borrow money may become exhausted. In former periods it was quite impossible to contract large national debts even by the most powerful governments. At that time a policy of collecting funds for extraordinary contingencies was adopted by many nations, as in the case of early Rome, where a sacred treasure was accumulated from certain sources and kept secure in the temple of Saturn. This plan was still a part of the national policy of the German Empire, which nation, while maintaining a national debt, had invested funds to offset its liabilities. For instance, in 1912 the debt of Germany amounted to about $120,000,000, while the invested funds aggregated $185,000,000, thus having to its credit $65,000,000 above its aggregate indebtedness.

The established governments did not begin to contract national debts until extensive systems of credit became recognized. Since that time the bonds, or evidences of indebtedness, of the various nations have been kept on the markets of the world. As a general rule the quotations have varied according to the rate of interest, the time specified for payment, and the stability of the nation issuing the bonds. Many writers on economics have advanced the theory that ultimately the vast indebtedness of nations would not only ruin their credit, but would require a widespread repudiation of their obligations. However, fears of this character are in the main groundless, since a world policy of nations requires them to meet their obligations or become merged into other governments that do have ability to make good the indebtedness. On the other hand, it has been asserted by writers of recognized authority that the institution of a national debt is the first evidence that a nation trends toward civilization. This is noticeable particularly in the case of Japan, where only a comparatively short time ago no national debt existed, but with the rise of its extensive industrial activity, such as the establishment of railroads, canals, harbors, manufactories, schools, and highways, there has grown a national debt quite as large as that of many European countries.

The usual way of instituting and maintaining a national debt is by the issuance of bonds. These bonds are made to mature at a definite time and bear a specified rate of interest, which

is payable quarterly, semiannually, or annually, and the particular kind of money in which the obligation is to be paid is especially named in the bond. In the United States the bonds were formerly payable in lawful money of the United States, but at present they are payable in coin. Besides its resources of securing money upon bonds, the government has in circulation paper currency known as greenbacks, which are virtually a part of the debt of the nation, but they bear no interest and are payable at the United States Treasury on demand. To defray the interest and reduce the national debt, the United States government maintains a tariff tax on imports and the so-called excises on spirituous liquors and tobacco. At divers times stamp taxes were levied, under which it became necessary to attach revenue stamps to various documents, and taxes upon the incomes of individuals were maintained in different periods.

The national debt of the United States dates from 1789, when the American colonies became a united nation. At that time the country suffered from the distressing war of the Revolution, when irredeemable paper money was issued and the young nation had no adequate income. Money had been borrowed from Holland and France and on Jan. 1, 1790, the United States assumed the payment of the debts of the several states, the total indebtedness amounting at that time to $71,000,000. The War of 1812 caused a great increase of the national debt. In 1816 it amounted to $127,334,933, but the abounding prosperity then existing made it possible to pay off the entire sum by 1835, and for a few years the debt was but a few thousand dollars. The Mexican War caused another enormous increase, until in 1850 it amounted to $63,452,773. At the beginning of the Civil War, in 1861, there was a national indebtedness of $90,580,873, but the expenses of the first year of the war were estimated at $300,000,000, while the revenue was only $60,000,000. To make up the necessary funds the government began to borrow heavily instead of taxing, and the long struggle that followed made it necessary to resort to borrowing to a large extent. Before the World War, in 1914, Canada had a total debt of $544,391,368; in 1925 the total debt was $2,818,066,523. The contracted national debt of the United States since 1861 is given as follows:

1862	$ 524,176,412	1880	$2,120,415,370
1863	1,119,772,138	1885	1,863,964,873
1864	1,815,784,370	1890	1,552,140,202
1865	2,680,647,869	1895	1,676,120,983
1866	2,773,236,173	1900	1,107,711,243
1870	2,480,672,427	1919	26,594,000,000
1875	2,232,284,531	1925	20,401,347,937

It is a remarkable fact that the rate of interest has been decreasing steadily on national debts. In many countries the rates range from 2 per cent. to 5 per cent. per annum, though in some cases the interest is from 3 per cent. to 6 per cent. Where the rate of interest is favorable to investors and the country is credited with ordinary stability, bonds usually sell at a premium, though there are instances in which the bonds are sold at a considerable discount. France has been remarkably prosperous with an enormous national debt, its prosperity ranging generally with the increase of its indebtedness. This fact is accounted for by economists in that an abundance of money lessens its purchasing power, and correspondingly increases the price of labor and the products resulting from applied intelligence. Hence, with an increase of indebtedness in France and other countries there has been a corresponding increase in the amount of money in circulation per capita, and the business prosperity has been materially influenced as a consequence. See **Debt.**

NATIONAL GUARD, a kind of militia organized in France in 1789, as a protection during the Revolution. It was made up largely of citizens of the middle class and the members were under control of the municipalities. Paris had 48,000 members, who were placed under the command of Lafayette, and later he received control of the entire organization in France, about 4,000,000. Napoleon defeated and disorganized the National Guard in 1795, but it was reorganized in 1814 and in 1830. In the Franco-German War the National Guard played an important part and after the war, in 1871, it served to oppress the insurrection of the Commune. It was abolished when the republic of France was established. In some countries of Europe and a number of states in the United States, the militia organizations are called National Guards.

NATIONAL HYMN, a popular tune or hymn used by the people of a nation, expressing the sentiments of loyalty and patriotism. In some cases hymns of this kind are selected by common consent, becoming popular through general usage, but in other instances they are selected by the legislature and made national through an enactment or a royal decree. It may be said that most national hymns are the outgrowth of folklore, or the results of a national event, the details of which are written in verse and set to music. All the nations have popular hymns of this kind, of which the following are the most important:

Argentina, Oid, mortales, el grito sagrado (Hear, O Mortals, the Sacred Call).

Austria, Gott erhalte unser Oestereich (May God Preserve and Keep Our Austria).

Bohemia, War-song of the Hussites.

Brazil, Hymno da Proclamacoa da Republica (Hymn of the Proclamation of the Republic).

Denmark, Kung Kristian stod ved hojan mast (King Christian stood beside the Mast).

Egypt, Salaam, Effendia (March of the Khedive).

Finland, Vart land (Our Land).

France, La Marseillaise.

Germany, Die Wacht am Rhein (Watch on the Rhine).

Great Britain, God Save the King.

Holland, Wilhelm van Nassau (Wilhelm of Nassau).

Italy, Royal March.

Japan, Keeméè gajo (May the Empire Last).

Mexico, Menicanos, al grito de gurra (Mexicans, at the Cry of War).

Peru, Somos libres, seamoslo siempre (We are Free, let us be so ever).

Prussia, Heil dir im Siegerkranz (Hail you in Victory's Wreath). Deutschland, Deutschland, über alles (Germany, Germany, over all).

Russia, Boghe Zaria chrany (God Protect the Czar).

Spain, Himno de Riego.

Sweden, Ur svenska hjertans (Out of the Swedish Heart).

Switzerland, Rufst du, mein Vaterland (Call'st thou, my Fatherland).

United States, Star Spangled Banner; Hail Columbia.

Venezuela, Gloria al bravo pueblo (Honor to a brave Nation).

NATIONALIST, a political party in Ireland, whose chief aim is to obtain independence from Great Britain. The adherents to this organization are more or less closely affiliated with the Land League, which was formed to promote the principle of Home Rule for Ireland.

NATIONAL MONUMENT, or the **Denkmal,** a monument of Germany, erected to commemorate the establishment of the German Empire in 1871. It is located on the Rhine, opposite Bingen, and stands 740 feet above the river. A beautifully decorated pedestal contains the statue of *Germania,* a female figure decorated with a laurel wreath and a sword, and wearing an imperial crown.

NATIONAL MUSEUM OF THE UNITED STATES, a depository of valuable collections at Washington, D. C. It is located near the Smithsonian Institution, in the south central part of the Mall, immediately west of the Army Medical Museum. Congress authorized the construction of a building in 1879, but a grant of $3,500,000 for a new building was made in 1903. This museum includes many historic relics of the government and of many public men, including Washington, Franklin, Jefferson, and Monroe. It contains the collections secured by scientific expeditions, numerous costumes and articles that have come down from the races of America and Europe, and vast exhibits showing the minerals, manufactures, and animal life of America. It is supported by an annual appropriation from Congress. Admission is free to the public at certain hours of the day. Several publications are issued that treat of the newly acquired facts in the sciences and the discoveries made from time to time in relation to plants and animals. The building in which the collection is housed has many large rooms, all of which are more or less completely filled with exhibits of value.

NATIONAL LIBRARY. See **Library of Congress.**

NATIONAL PARK. See **Yellowstone Park; Parks; Yosemite.**

NATURAL BRIDGE, a remarkable natural formation of the United States, in Rockbridge County, Virginia, 115 miles west of Richmond. It is a natural bridge of rock across Cedar Creek, spanning an opening 80 feet wide. The bridge has a width of 100 feet and is 215 feet high. It is crossed by a public road.

NATURAL GAS, a product found widely distributed as a deposit in the crust of the earth. It is regarded by chemists as resulting from the decomposition of animal and vegetable remains. The principal element is marsh gas, but it contains varying quantities of oxygen, hydrogen, nitrogen, carbonic acid, ethylene, and carbonic oxide. Natural gas varies in composition according to the different regions where it is produced, and lacks some of the elements that form manufactured illuminating gas, particularly the hydrocarbon. Accounts of burning springs and wells have come down to us from remote antiquity, especially from different regions of Asia and Europe, and fissures from which gas escaped were discovered in the early settlements of America. In 1821 the first attempt to utilize the gas in America was made at Fredonia, N. Y., where it was used for illuminating purposes.

The first extensive gas deposits were discovered in the Ohio valley, in 1866, while drilling for petroleum, but its commercial value did not become apparent until about 1884, when the enterprise of prospecting was conducted in various sections of the United States. Extensive deposits are utilized at present in Pennsylvania, Ohio, Indiana, Kansas, Texas, Louisiana, and various regions of Eurasia and Africa. It is usually found in connection with petroleum, but sometimes with salt beds, and issues from the openings with more or less force. In many cases the pressure is very great. Owing to this pressure it has been found practical to conduct the gas through pipes long distances for illuminating and manufacturing purposes.

The greatest natural gas fields extend along the west side of the Allegheny Mountains, from New York through Pennsylvania, West Virginia, Ohio, Indiana, Kentucky, and Tennessee, the most productive fields being in the Ohio valley. The gas fields of Kansas are located in the vicinity of Iola, where a single well supplies 10,000,000 cubic feet per day, and enormous quantities are used to reduce lead and zinc ores produced in the vicinity of Joplin, Mo. Productive gas deposits occur in Oklahoma, Texas, Ontario, and California. In some cases it is necessary to go 3,500 feet to reach the gas deposits, and in many instances the pressure is sufficient to lift many tons into the air. However, it has been found that the pressure gradually lessens after flowing for a long period of time. This circumstance has led some writers

to believe that the supply will become exhausted in a comparatively short period.

NATURAL HISTORY, the history of universal nature or of natural objects, treating specifically of their qualities, forces, origin, and the laws of existence. In general it embraces the branches of botany, chemistry, mineralogy, geology, natural philosophy, paleontology, and zoölogy. In a more limited sense it refers only to botany and zoölogy, and some writers restrict the term entirely to zoölogy. In most schools as at present organized, the term natural history is confined to biology, being a study of organic nature.

NATURALIZATION (năt-ū-ral-ĭ-zā′shŭn), the process by which an alien or foreigner may become a citizen in the country where he wishes to reside. Naturalization laws are passed in the different nations according to the regulations and rules recognized by treaty with the countries from which the aliens have emigrated. The process involves renouncing allegiance to one country and assuming the duties of citizenship in another. This right was recognized by the United States from the beginning of its history, and a denial of it by Great Britain was one of the causes of the War of 1812. England at that time held that an Englishman always remains an Englishman and accordingly impressed citizens of the United States into its service. It undertook to punish for treason a number of individuals who had taken up arms against that country. However, in 1870 Great Britain recognized the right of its subjects to renounce allegiance to that country, although both the mother country and many of the colonies had previously recognized the right of aliens to become citizens. Before the adoption of the Constitution the several states had the exclusive control of naturalization, and accordingly the period for becoming citizens varied widely as to the time required for completing full citizenship and in other respects. At present the entire matter is regulated by national law, and the time required to complete naturalization is five years.

A declaration under oath setting forth that the alien desires to become a citizen may be made immediately on coming to United States territory, but in all cases there must be two years between the first declaration and the completion of citizenship. Persons who have served in the army or navy of the United States are entitled to a reduction from the five-year limit, by the exact length of time of such service. Children of persons duly naturalized at the time the children were under the age of 21 years become citizens when they reach the legal age of 21 years. The right to vote comes from the State, hence the State may confer upon persons who are not citizens of the United States the right to vote. Thus, in several states the right of suffrage is conferred upon persons of foreign birth otherwise qualified, who have declared their intentions to become citizens of the United States. The states where this regulation now is in vogue include Arkansas, Florida, Georgia, Indiana, Kansas, Michigan, Minnesota, Nebraska, North Carolina, Oregon, Texas, and Wisconsin. Several of the states require that the individual shall be able to read the constitution in the English and that he shall be a taxpayer.

An alien may hold and transfer property in Canada, but he cannot vote or hold an office. Three years' residence or three years' service in the army are required before an alien may become naturalized in the Dominion. However, an alien is not required to forswear allegiance to his country of origin, as in the United States, but need only to swear or affirm allegiance to the reigning sovereign. A married woman is a citizen of the Province in which her husband is a subject. The children of parents who are naturalized are considered subjects of Canada.

The naturalization laws of Great Britain are not exclusively national, but depend upon the particular colony in which application is made, though in most cases five years' residence or military service is required. In Germany the laws permit naturalization of all persons coming from countries that recognize their right to renounce allegiance, but they make the additional requirements that the individual possess a good moral character and visible means of support. France recognizes naturalization after three years' residence, but any one residing there for ten years becomes a citizen for all purposes without any preliminary ceremony. Naturalization of the husband is recognized as sufficient to entitle the wife to all the privileges accorded to her sex in any of the countries recognizing naturalization. In nearly all countries the minor children of a father who became a naturalized citizen attain the full privileges of citizenship when they attain majority.

NATURAL SELECTION, a term applied by Darwin in relation to his theory of the origin of species. According to it some plants and animals survive and propagate under conditions of nature favorable to them, while the forms not peculiarly fitted to survive disappear. This theory implies that all species of plant and animal life vary more or less through the different climatic epochs, and that the structure of the young becomes modified in relation to the parent, and that of the parent in relation to the young. It is assumed that at first only a single kind or a few species existed. As these became perpetuated under natural selection, new characters differing widely from the original stock appeared, the new forms being different from the original both in structure and function to such an extent that they became regarded as new species. *Artificial selection* is a term applied in opposition to natural selection, and has reference to the domestication and breeding of such animals as horses, swine, cattle, sheep, dogs, and many others. The methods employed in artificial selection are in imitation of the processes

found in nature, the product derived from such process often differing to a great extent from the original type. Natural and artificial selection imply the survival of the types best fitted to be perpetuated naturally, or for the purposes of use in commercial or other enterprises. The mule is a good example of the profitable employment of artificial selection.

NATURAL THEOLOGY, the science which treats of the mutual relations between God and man as they may be learned by the study of nature, instead of through revelation. It proceeds upon the theory that the Creator is revealed through his work, by the things or beings created, and may therefore become known to those who investigate the evidences that are obtainable in the universe.

NATURE STUDY, the subject which involves a study of objects in nature, such as plants, animals, and minerals. No theme is of greater interest to students in the common schools than the material world which surrounds us. The intellectual powers of man being an essential feature of man's nature, they demand exercise. This exercise is invariably accompanied by an intense pleasure, especially if the mind is engaged in contemplating objects which awaken new knowledge and stimulate the interest by new and attractive features. Indeed, the physical well-being of man depends upon his coming into proper relations with physical nature. Since it is important for him to understand these relations, it is essential that the mind of youth be enlightened in regard to them.

The order in which the objects of nature, or the sciences which are suitable for the common schools, should be studied, may be considered of interest in contemplating the study of nature. Plants, for instance, are among the simplest and most common objects with which we come in contact. The child is interested in examining the structure of the plants and the growth of the various parts. An appeal is also made to his powers of grouping, or, in other words, of classification. In botany the pupil has a large field for these two activities. The same is true of the study of zoölogy, but the processes are a little more complicated. Therefore, the study of animals should follow the study of plants. From these the pupil may proceed to geography, the elements of physics and chemistry, the study of minerals, and ultimately to physiology. All the departments of this instruction should be accompanied by practice work in drawing and composition, intensifying the interest by conversational lessons and the study of gems from literature. Below is an outline which serves to indicate an elementary course of what to teach in nature study for the three terms of a common school:

OBJECT:

1. To increase the power of observation in children.
2. To awaken and enlist the interest of the children in their immediate environment.
3. To give practical information about the common things of life.

I. FALL TERM.

A.—The common flowers, fruits, grasses, weeds, leaves, trees, etc.

1. Collect specimens and bring to schoolroom for study. (Where possible, children should make the collection.)
2. Make study of each specimen as to color, size, form, where found, how grown, short description, use, etc.
3. Represent each in color work in drawing. (The best drawings at the time to be collected and preserved.)
4. Collect pictures of these things and classify for study.

B.—The more common insects and worms.

1. Covering, color, size, form, habits, and use. (Specimens to be collected, brought into the schoolroom, studied, and preserved for future use.)
2. Collect and classify pictures for study.
3. Represent in color drawings. (Preserve the best.)

C.—Domestic and common wild animals.

1. Covering, color, size, habits, and use. (Children to make observations and tell what they observe.)
2. Collect and classify pictures for study.
3. Represent in color drawings. (Preserve the best.)

D.—Domestic fowls and birds.

1. Teach something of color, size, habits, dress, and use of each. (Children to be given an opportunity to make observations about these fowls and birds.)
2. Collect and classify pictures for study. (Where possible to get a stuffed specimen, do so.)
3. Represent in color drawing, as far as possible, a picture of each. (Preserve the best.)

E.—Observations on the weather.

1. Clear and cloudy days.
2. Calm and windy days.
3. Warm and cold days.
4. Rainy days.
5. Make chart indicating simplest observations and preserve it.
6. As far as possible, collect pictures.
7. Represent in color drawings little scenes showing sunshine, clouds, etc.

F.—Observations on the surface of the earth and simple directions and distance taught.

1. Hill, hollow, brooklet, stream.
2. Represent these in drawings.
3. North, south, east, and west.
4. Far and near, etc.

G.—Literature and language.

1. Memory gems and poems about nature.
2. These to be selected and suited to the topic under consideration and taught at the time.

3. Story of Hiawatha.
4. Other stories, as "Little Red Riding Hood," "The Three Bears," etc. (These to be acted and played.)

H.—Finally, as a fitting close for the fall work, the idea of the ingathering of the harvests, as represented in the Thanksgiving Celebration, etc. The Evening of Life.

II. Winter Term.

A.—Preparation of different things for winter.
1. Flowers, grasses, weeds, trees, etc., closing of the buds, changes in the grass, weeds, trees. Why?
2. Insects; change. What becomes of them?
3. Fowls and birds; change. Migration of birds.
4. Animals change in covering. Why?
5. Continue observations on weather—snow, ice, cold, frost, and fire.
6. Winter scenes represented in drawings.
7. Pictures collected and classified.
8. Children's sports and games.
9. Memory gems and poems suited through the season.
10. Continue the study of stories, acted and played. The idea here represented is that all nature goes to sleep. It is the Nighttime of Life.

III. Spring Term.

A.—Preparation for spring.
1. Opening of the buds. (Get the earliest buds and twigs for study.)
2. The springing up of the grass and weeds.
3. The leafing of the trees.
4. The flowering of the plants.
5. The coming of the birds and insects.
6. Change in the animals—shedding of their winter coverings, etc.
7. Change of fowls.
8. Memory gems and poems suitable to the season and the lesson.
9. Stories acted and played.
10. Pictures collected and classified. The idea here represented is the awakening of all nature. The Morning of Life.

NATURE WORSHIP, the worship of the personified powers of nature, forming a crude religion. It is based upon the belief that the objects of nature possess certain powers or spirits through which they are able to aid and direct mankind. Two classes are more or less distinctly recognized, one of which regards the object itself as a divinity and the other considers it merely as the abode of a divinity. Water has long been worshiped as divine, while others worship the locality or the stream rather than the water itself. Such may be said of the American Indians, who looked upon Niagara as a great spirit, but did not consider water as a divinity. The Aztecs regarded the East Wind a deity, while the Hindus look upon the Ganges as a sacred stream. Many of the early philosophers supported some form of nature worship, such as a deification of fire, of certain mountains, and of the sun.

NAUGATUCK (nȧ'gȧ-tŭk), a borough of Connecticut, in New Haven County, on the Naugatuck River, 25 miles southwest of Hartford. It is on the New York, New Haven and Hartford Railroad. Among the noteworthy buildings are the Naugatuck High School, the public library, the Sacred Heart Academy, and the Community House. It has manufactures of rubber goods, clothing, earthenware, and machinery. The surrounding country is fertile, producing cereals, grasses, and dairy products. It has a considerable trade in merchandise. Waterworks, electric lights, and rapid transit are among the general improvements. Naugatuck was first incorporated in 1844. Population, 1920, 15,051.

NAUTICAL ALMANAC. See **Almanac.**

NAUTILUS (nȧ'tĭ-lŭs), the name applied formerly to a large genus of mollusks. At present it is confined to only three existing species. Fossil remains indicate that more than one hundred species lived in the different geological periods. Those now existing are found in the southern seas, where they creep at the bottom of the water. The nautilus is distinguished from the cuttlefish by a shell. It lives in the outer chamber of the shell and has a number of tentacles around the mouth. Its eyes are saclike and the head and arms protrude from the many-chambered shell, which is formed like a spiral. The animal occupies the inner chamber when young, and each chamber is occupied in succession by the animal advancing at intervals as it increases in size, forming the larger chamber and partitioning off the last one occupied.

NAUTILUS.

The species known as *pearly nautilus* has a thin crust covering the shell and beneath it is a porcelainlike formation. At the interior the structure is of mother-of-pearl. Another common species is known as the *paper nautilus,* or *argonaut,* so called from its alleged tendency to lift its arms while swimming at the surface of the water. These mollusks propel themselves by means of squirting water from the arms. They are thought to be able to store air in the unoccupied chambers of the shells and, by filling or exhausting them of air, to change the total weight for the purpose of rising or sinking in the water. The food consists mostly of crustaceans. Many of the natives of the East Indies

and other tropical islands catch the pearly nautilus for its shell, which they use in making ornaments, while the Fijians and others esteem it as an article of food.

NAUVOO (nạ-vōō′), a town of Hancock County, Illinois, 32 miles southwest of Burlington, Iowa. It is surrounded by a farming and fruit-growing country. Nauvoo has several schools, a Catholic academy, and a number of manufactories. It was founded in 1840 by the Mormons and in 1846 had a population of fully 15,000. Joseph Smith and his followers erected a fine temple, but after the assassination of that prophet the structure was destroyed. Subsequently a community of French socialists, called Icarians, was established in Nauvoo under M. Cabet, but the experiment proved a failure. Population, 1900, 1,321; in 1920, 972.

NAVAJOES (nä′vä-hōs), or **Navahos,** an Indian tribe of North America, belonging to the Athabascan family, formerly found in the northern part of Arizona and New Mexico. They first became known to the Spaniards in 1630. Attempts made by the Mexicans to reduce them failed at different times, but in 1863 they were defeated by Colonel Carson. They now occupy a large reservation in the adjoining corners of Arizona, Colorado, New Mexico, and Utah, where they carry on farming and stock raising. The principal products are corn, wheat, fruits, vegetables, horses, cattle, mules, goats, and sheep. Government schools are maintained for their instruction, and many have shown remarkable aptitude in taking up the civilized arts of industry and education. However, they have been persistent in maintaining their language and customs. The tribe at present numbers 20,500.

NAVAL ACADEMY, a government training school maintained by the United States at Annapolis, Md., which trains cadets for the American navy on a similar basis as those trained for the army at the West Point Military Academy. The institution is situated on a site near the Severn River, which was formerly occupied by Fort Severn. Fifty acres of ground are inclosed by walls, but in addition there is a tract of 109 acres, and these, with the facilities afforded by the Severn River, provide ample accommodations for practical exercises and instruction, both on land and in the manipulation of vessels on water. The institution is supplied with vessels for practical training. It has an efficient corps of instructors and an attendance of about 1,976 students. Its course of study provides four years of academic work, which is supplemented by two years' practical instruction at sea. The course is uniform for all students the first three years, while in the fourth year the study of engineering is pursued by engineer cadets. Graduates are commissioned according to the branch of service for which the cadets have prepared, the positions being that of ensigns, second lieutenants of marines, and assistant engineers. Cadets receive their appointment from members of Congress, each Senator, Representative, and Delegate having the right to appoint a cadet every two years. Eleven additional cadets are appointed by the President of the United States. Searching examinations in relation to physical and educational matters are required after appointment, and only those showing a high degree of qualification are admitted.

NAVAL OBSERVATORY, an institution founded by the government of the United States in 1842. It is located at Georgetown Heights, Washington, D. C., and is under the supervision of the Bureau of Navigation. The purpose of this institution is to make research in astronomical phenomena, and the buildings and equipments rank among the most extensive of the kind in the world. It has many modern appliances, such as astronomical clocks, transit instruments, photoheliographs, and a library of 22,500 volumes. Among the equipments is a 26-inch refracting telescope made by Alvan Graham Clark, with which Asaph Hall discovered the satellites of Mars in 1877. Several periodicals are issued, including the *Nautical Almanac,* which has appeared regularly since 1894.

NAVAL RESERVE, or **Naval Militia,** a force of men maintained as an adjunct to the regular naval forces. In Great Britain this reserve is divided into three classes known as the royal naval reserve, the royal fleet reserve, and the pensioners. These three classes include about 43,500 men, to which is added the coast guard of 4,200 men. In the United States the naval reserve is a part of the national guard and consists of about 5,000 officers and men. During the time of peace they are employed in various lines, including guard service and assignments in the life-saving service. France has about 50,000 naval reserves and Germany has 10,000. These men receive more or less training for their duties. In some countries they consist largely of those who serve a term of enlistment in the navy, after which they volunteer or are drafted into the naval reserve.

NAVAL SCHOOLS, a class of schools that train officers and men for service in the navy. The leading nations maintain institutions of this kind, though they differ somewhat in the requirements for admission and the courses of study offered to the students. The Naval Academy (q. v.) at Annapolis, Md., is the leading institution of this kind in the United States. At Newport, R. I., is the Naval War College, at which officers are instructed and plans are prepared for naval operations. Goat Island, in the harbor of Newport, R. I., is the seat of the Naval Torpedo School. Other institutions of a similar kind are located at Port Royal, S. C.; Lake Bluff, Ill.; and San Francisco, Cal. The leading naval school of Great Britain is located at Dartmouth, England, that of Germany is at Kiel, that of Denmark is at Copenhagen, and

that of France is at Brest. A large part of the actual training is on board of seagoing ships which carry a naval instructor. In most cases instruction in pilotage, gunnery, and torpedo management is given after leaving college.

NAVARINO (nä-vä-rē'nō), or **Neocastro,** a seaport on the southwestern coast of Morea, in Greece. It is situated in the nomarchy of Messenia, on the Bay of Navarino, and is noted for its excellent harbor and importance as a strategic point. Old Navarino is located at the northern part of the bay, Navarino on the southern shore, and the island of Sphagia is at its entrance. The bay was the scene of a noted naval battle in 425 B. C., when Cleon commanded the Athenian fleet against the Spartans, and after prolonged encounters attained a decisive victory. Another decisive battle occurred here on Oct. 20, 1827, when the allied navies of the Russians, French, and British destroyed the navies of Egypt and Turkey.

NAVARRA (nä-vär'rä), or **Navarre,** a province of Spain, but formerly a European kingdom. It is situated in the northern part of Spain, being bounded on the north by France. The province contains an area of 4,040 square miles. Ranges of the Pyrenees traverse the northern part, where extensive forests abound, and the regions in the southern part are noted for their fertility, being situated in the valleys of the Ebro, Aragon, and Arga rivers. The mountainous districts contain deposits of copper, iron, lead, salt, and other minerals. Among the agricultural products are grasses, wheat, corn, rye, flax, and hemp. It has extensive interests in the rearing of cattle and the production of fruits, spirituous liquors, cotton and woolen goods, and leather. Several important railroad lines traverse the province. Pamplona is the capital. The region was formerly occupied by the Vascones, who were conquered in the 5th century by the Goths, and subsequently the district formed portions of different possessions. As a kingdom Navarra included the Spanish province of Navarra and the French departments of Landes and Basses-Pyrénées. The kingdom dates from about the middle of the 9th century and ended in 1512, when Ferdinand the Catholic annexed the larger portion to Castile. Subsequently the remainder was added to the French possessions under Henry IV. Population, 1920, 312,020.

NAVARRO (nä-vär'ō), **Mary Antoinette Anderson,** actress, born in Sacramento, Cal., July 8, 1859. Her education was secured at the Ursuline Convent in Sacramento, and in 1875 she made her first appearance as *Juliet* in "Romeo and Juliet" at Louisville, Ky. In 1876 she appeared with much success in New York. She made a trip to Europe in 1879 and again in 1883, when she played successfully at the Lyceum Theater in London. On June 18, 1890, she married Antonio F. de Navarro, son of a wealthy Mexican resident of New York City, and shortly after retired from the stage. She published an interesting account of her travels in 1896 under the title "A Few Memories."

NAVEL (nā'v'l), the depression or scar on the abdomen of man, where the umbilical cord of the foetus was attached. The foetus communicates with the parent through the placenta, but in the adult the passage is closed, the healing after separation producing the familiar depressed appearance.

NAVIGATION (năv-ĭ-gā'shŭn), the art or science of navigating by means of vessels from one port on the sea or ocean to another by the most available route. The term is likewise applied to the art of determining the direction and distance of a vessel at sea and to the art of measuring the course and position of vessels. The general working of the vessels by managing the sails, rudder, and other appliances belongs to seamanship. In practice the position of a ship at sea is determined either by keeping a record of the course in which it sails and the distance traversed, or by observing the heavenly bodies by means of spherical trigonometry. The former gives only approximate results, while general accuracy may be obtained by the latter. Vast improvements have been made in the science of navigation since the Middle Ages. Those of material value include the invention of Mercator's chart, in 1569; the institution of tables of meridional parts, in 1579; the invention of Davison's quadrant, in 1600; the application of logarithms by Edmond Gunther, in 1620; the measurement of degrees on the meridian by Richard Norwood, in 1631; and the computation of longitude by Harrison's chronometer, in 1764. At present careful calculation is made of a ship's position in relation to its deviation from a direct course by reason of currents and winds, which is determined by what is known as *dead reckoning,* though no method may be regarded accurate, except the measurement of heavenly bodies by spherical trigonometry.

Navigation laws were first authorized in the United States under the Constitution, the earliest being passed in 1789. By the terms of the act of 1789 a tonnage tax of six cents per ton was levied on all American vessels, and one of fifty cents per ton on those owned in foreign countries and entering American ports. An act requiring American registration was passed in 1792 and the following year the coasting trade was closed to foreign vessels. That legislation highly favorable to American commerce should follow the American war of independence was to be expected. It was designed to secure a monopoly of the foreign trade for the United States, giving American shippers the advantage in carrying foreign products. In 1816 the navigation laws of the United States were modeled largely after those of Great Britain and consuls began to receive their fees from the government. At the outbreak of the Civil War tonnage taxes

were renewed. They reached a rate of thirty cents per ton.

NAVIGATION ACTS, the name given to a series of laws enacted by the Parliament of England, designed to aid and protect commerce and extend the colonial interests of the nation. The first of these acts was passed in 1645 and, as subsequently amended, they provided that all importations into England were to be made with ships built within the country or its colonies and which were manned by English citizens. In 1663 an act was passed which required that all exports from the American colonies be sent to England and imposed prohibitive duties upon imports into the colonies, except upon those obtained from British ports. Later duties were imposed upon goods imported by one colony from another, provided the imports could be obtained in England. Parliament directed legislation against the development of manufacturing enterprises in the colonies as early as 1719, thinking thereby to develop industries at home. Many commodities were not permitted to be exchanged among the colonies, but these acts subsequently gave rise to the practice of smuggling, which assumed large proportions before the American Revolution. In 1798 a new policy of navigation came into practice between France and America, which declared in favor of equality and reciprocity in trade. In 1789, after the adoption of the Constitution in the United States, import taxes and tonnage duties were enacted which gave the United States a practical monopoly in America. This tended to modify the navigation system of England, where the prohibitive navigation laws were finally repealed in 1824.

NAVILLE (nȧ-vēl'), **Edourd Henri,** Egyptologist, born at Geneva, Switzerland, June 14, 1844; died Oct. 17, 1926. He studied at Geneva and King's College, London, and subsequently graduated at the University of Bonn, Germany. In 1867 he was graduated at the University of Paris and later took courses in Egyptology at Berlin. In 1869 he went to Egypt to make explorations of ancient ruins, and the following year published several extensive reports of his discoveries. The London Congress of Orientalists commissioned him, in 1874, to edit the Egyptian "Book of the Dead," which he published, after making a research for ten years, under the title "Egyptian Books of the Dead, Covering the 18th, 19th, and 20th Dynasties." He was made professor of Egyptology in the University of Geneva, where he did much useful work and at intervals made trips to Egypt to conduct investigations. Among his works are "Goshen and the Shrine of Saft el Henneh," "Store City of Pithom and the Route of the Exodus," and "Festival Hall of Osorkou II."

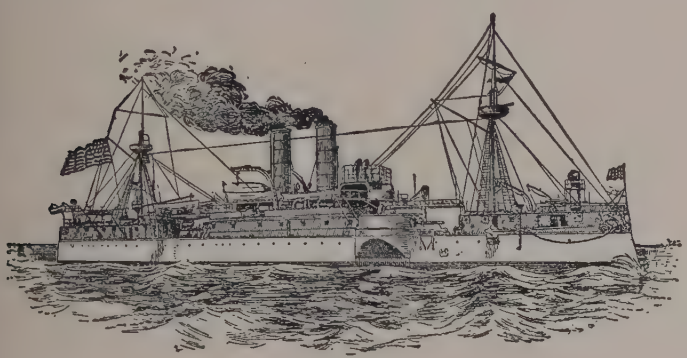
NAVY, the entire marine military force of a country under the control of the government, embracing vessels, men in the service, stores, yards, and all appliances. The term is applied quite generally to the entire shipping of a country engaged in trade and commerce, though as commonly understood it refers only to marine forces for aggressive and defensive operations.

Ancient. In ancient times the navies consisted mostly of *beaked vessels,* which were driven with much force against each other, in a manner similar to the rams used at present, though the propelling force consisted exclusively of oars. An ancient navy was usually made up of a large number of boats, each containing from one to three tiers of oars. The oars were operated by sailors sitting or standing at a convenient place, while sails were provided to be raised when it was designed to reach a point some distance from the place of starting. In the 7th century B. C. efficient navies were supported by the Carthaginians, Persians, Phoenicians, and Greeks. The first naval engagement recorded in history occurred in 664 B. C. between the Corinthians and their settlements established in Corcyra. A notable naval engagement occurred in 480 B. C. at Salamis, when Themistocles with a Grecian fleet defeated the Persians under Xerxes by taking advantage of his position in the narrow straits.

When the fleet of Athens was destroyed in the expedition of 414 B. C. against Syracuse, Carthage became the most powerful naval force, but with the rise of Rome that country established itself as the greatest naval power. The Romans partly discarded beaked vessels and constructed those fitted to carry a large force of armed men, who were trained to fight with arrows and javelins, after running the vessels alongside those of the enemy. Swift-sailing galleys were introduced by the Moors and peoples from Northern Europe, the Norsemen being particularly efficient in the construction of vessels calculated to serve in plundering the coasts of civilized nations. Soon after whole fleets were constructed for this purpose by Genoa, Venice, Aragon, France, and Denmark. Venice became the great naval power of the Mediterranean and laid waste the fleet of Genoa and Turkey, but the development of Mohammedanism gave impetus to the naval development of Turkey and by the 16th century that nation became mistress of the Mediterranean. To counteract Moslem power an alliance of Christian nations followed and the Turks were defeated temporarily in 1715 at the famous Battle of Lepanto. In the early part of the 17th century Spain was the principal power upon the seas, its prosperity being due chiefly to the establishment of vast colonies in America. Holland was the most powerful rival of Spain, though both France and England began to attain eminence as naval powers.

Modern. The history of modern navies begins with the destruction of the Spanish Armada in 1588 by the English, but the Dutch for nearly a century after that were recognized as the most important naval power in the world. In the reign of Charles II. a long struggle for

mastery between the English and Dutch finally gave the former precedence. Throughout the 18th century the naval forces of England and France were practically equal, though the former were threatened seriously in the reign of Louis XVI. Russia began to develop eminence as a naval power at that time and the fleets of Holland and Spain likewise were reorganized and strengthened. However, in the early part of the last century Great Britain began to take precedence as the most extensive naval power in the world and its navy is still the largest of the nations. The first effort to organize a navy in America was made in the latter part of 1775, when thirteen frigates were ordered to be constructed. Some exploits were made with them in the Revolutionary War, but most of the naval achievements of that conflict were accomplished by the privateers. By 1781 all the English vessels in America were destroyed or captured. At the beginning of the War of 1812 the United States had about twenty vessels, while England had 830. The Americans were so generally successful on the seas that Congress made larger appropriations for the construction of vessels.



BATTLE SHIP.

The first attempt at a *protected vessel* was made at Toulon, France, in 1859, when the *La Gloire* was launched, but ironclads did not come into use until after the armored *Monitor* invented by Ericsson proved the efficiency of that class of vessels in the Civil War. In 1864 the United States government had 588 vessels, but after the Civil War the navy was reduced, and in 1882 there were but 38 that were capable of seagoing service. However, the navy has been increased materially within the last few years and now consists of more than 100 serviceable vessels. It includes about 30 battleships, 25 cruisers, six double-turreted monitors, and a large number of torpedo boats, the ram *Katahdin,* many unarmored vessels, and several wooden vessels. According to a regulation established as early as 1819, battleships are named after the States, cruisers after cities, and frigates after the rivers of the United States. The battleship is the most important vessel of the navy. It comprises practically a locomotive force and consists of a steel hull strengthened below the water line by longitudinal and transverse bulkheads, along the water line with heavy steel armor, and at the front and back by heavy curved protected decks.

The length of a battleship ranges from 300 to 475 feet, the displacement from 10,000 to 35,000 tons, and the speed from fifteen to twenty-three knots per hour. Cruisers are vessels next in importance to battleships, and their construction is primarily for speed. They differ from battleships mainly in having little armor along the water line, the protection being chiefly by a thick protected deck, and by lighter plates than are provided on battleships. Cruisers also are smaller, carry a lighter battery, and their offensive and defensive power has been sacrificed for speed. All important fleets are now composed of battleships, armored and protected cruisers, scouts, torpedo vessels, and torpedo boats. Monitors and rams are kept to defend harbors and gunboats are employed for service in time of peace, for cruising, and for police duties. The principal navies of the world include those of Great Britain, the United States, France, Italy, Japan and Holland. In the United States the navy is under the control of the Secretary of the Navy, who has headquarters at Washington. The Spanish-American War of 1898 demonstrated the superior efficiency of the American navy in every respect, particularly by the complete destruction of the Spanish fleets in Manila Bay by Admiral Dewey and off Santiago de Cuba under Admirals Schley and Sampson.

The Great European War caused many changes in the navies of the world. The naval strength of Germany and Russia was either destroyed or limited, while the naval power of Great Britain and the United States stood at the head, both in number and capacity of the vessels. In 1922 the so-called Five-Power Naval Pact was concluded, by which the construction of ships was restricted and the contracting nations agreed to limit the total tonnage of their capital ships (ranging from 10,000 to 35,000 tons) as follows: Great Britain 525,000 tons; United States 525,000; Japan 315,000 tons; Italy 175,000 tons; France 175,000 tons.

NAVY, Department of. See **United States, Departments of.**

NAZARENES (năz-ā-rēnz′), a term applied by the Jews to the inhabitants of Nazareth, afterward used to designate the early Christians in Judea. Later the name was applied to a sect that formed an organization near the close of

the 1st century, whose adherents resided principally in Egypt. This peculiar sect, also called Ebionites, held doubts as to the divinity of Christ and adhered closely to the Mosaic law.

NAZARETH (năz'ă-rĕth), a town in Palestine, 64 miles north of Jerusalem, in the region comprising ancient Galilee. It is celebrated principally as the scene of the Annunciation and for being the home of Christ during his early life. The site of the town is among hills and the houses are principally of stone. It was overlooked by the early church for many years. The Christians first made pilgrimages to it in the 6th century, but at present it contains a Roman Catholic convent founded by the Franciscan monks and a Greek Catholic church, the latter being on the scene of the Annunciation. Visitors are shown the place where Joseph's workshop stood, the table from which the last supper was eaten by the apostles, and the site of the synagogue out of which our Lord was put by his townsmen. The population of Nazareth at present is 11,640, most of which is made up of Christians.

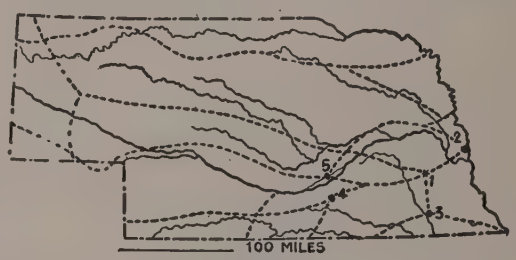
NAZARITES (năz'ă-rīts), a class of Hebrews, who were bound by oath to abstain from the use of wine and every other strong drink and from contact with the dead. Their hair was to be unshorn. Two classes of Nazarites existed at an early period, including those who took the vow for a limited period and those who took it for life. Samson was a Nazarite.

NEBO, Mount, an elevated mountain peak of Palestine, situated east of the Dead Sea. It is celebrated from the fact that Moses viewed the promised land from the summit shortly before his death, and because it is reputed to be his place of burial.

NEBRASKA (nĕ-brăs'kà), a central state of the United States, near the geographical center of the Union, known popularly as the *Planter State.* It is bounded on the north by South Dakota, east by Iowa and Missouri, south by Kansas and Colorado, and west by Colorado and Wyoming. The length from east to west is 420 miles; width, 208 miles; and area, 77,510 square miles, including a water surface of 670 square miles. Among the states it takes rank as the thirteenth in size.

Description. In the southeastern part of the State the elevation above sea level is 880 feet, but it gradually rises toward the west and north, until it attains an elevation of 5,050 feet, while the general elevation is about 2,350 feet. The surface consists largely of an elevated plain, but few of the eminences rise much above the general level. Valleys of considerable extent lie along the rivers in the east, but in the western part the streams flow through deep channels, along many of which are abrupt and precipitous bluffs. A large part in the northwestern corner is included in the Bad Lands, which consist of sandy ranges that extend into the State from South Dakota. In the western part are highlands that form the lower foothills of the Rocky Mountains, of which Wildcat Mountain, height 5,050 feet, is the highest summit.

The drainage is mostly toward the east, the principal rivers flowing into the Missouri, which forms the eastern boundary. An elevated ridge extends in a northerly direction from Fremont, separating the streams that flow into the Platte from those that discharge directly into the Missouri. The Platte River, formed at North Platte by the junction of the North Platte and South Platte rivers, has an eastward course and joins the Missouri at Plattsmouth. It receives the Elkhorn and the Loup rivers from the north. The Niobrara enters the State from Wyoming and flows eastward along the northern boundary, joining the Missouri at Running Water. The northwestern corner of the State is drained by the White, which passes into South Dakota and discharges into the Missouri. A large part in the south is drained by the Republican, which flows eastward from Colorado to Superior,



NEBRASKA.

1, Lincoln; 2, Omaha; 3, Beatrice; 4, Hastings; 5, Grand Island. Chief railroads shown by dotted lines.

where it passes into Kansas. It receives the inflow from the Red Willow and the Big Blue. The southeastern corner of the State is drained by the Nemaha and the Little Nemaha. Many small lakes abound in the north central part of the State, some of which are saline.

The climate of Nebraska is continental, being quite cold in the winter and warm in the summer, but the nights of the warmer season are generally pleasant. Though subject to sudden changes, the climate is healthful and favorable to agriculture. At Fremont the mean temperature is given at 51°, while the temperature of the State ranges from 18° below zero to 95° and rarely to 108° above. The annual rainfall averages 23 inches for the State, ranging from about 32 inches in the eastern section to 12 inches in the western part. Rainfall is abundant in the eastern half of the State, but the western counties are quite arid, requiring irrigation to insure the maturity of most cereals. Nebraska is distinctly a prairie State, though originally belts of timber stretched along the streams, and at present there are splendid groves and artificially reared forests that were cultivated largely under the timber-claim law. Ash, willow, oak, spruce, pine, maple, elm, and cottonwood are the principal varieties of timber.

MINERALS. The State is not rich in mineral wealth, but the output has grown in value with each decade. Clay products stand at the head of the list, being peculiarly valuable for the manufacture of brick and tile. Limestone is abundant in several sections, especially along the North Platte and the South Platte rivers. A small coal field is found in the northeastern part of the State, but the output is not considerable. Deposits of ocher are worked in the south central counties. Other minerals include red lead, glass sand, and mineral waters.

AGRICULTURE. The State takes rank as one of the leading agricultural communities. Seventy per cent. of the total land area is cultivated in farms, which average 240 acres. Corn is grown on about one-half of the cultivated area, and the yield is valuable both in quality and in the amount produced per acre. Hay takes rank as second in acreage. Other important crops include wheat, oats, rye, potatoes, and barley. Much progress has been made in cultivating sugar beets, in the yield of which the State takes a high rank. Irrigation has been installed in the westen part, hence the cultivated area is greatly enlarged over that of previous years.

Originally the prairie lands were covered with buffalo grass, which has been instrumental in developing the live-stock industry. These grass lands are still abundant, but in many places blue joint and cultivated grasses have added to the available pasturage. Cattle are reared extensively for meat and dairy products, but the cattle ranches of the western part are concerned more largely with growing neat cattle, many of which are fatted on the ranges and shipped direct to market, while considerable quantities are transported to the eastern part of the State to be fed. Especially large interests are vested in swine, owing to the favorable climate and the large production of corn. Other live stock includes horses, sheep, and mules. Much of the farming is diversified and large quantities of small fruit are grown. The southeastern part of the State is especially noted for its choice varieties of apples, grapes, and plums.

MANUFACTURING. Slaughtering and meat packing are centered at Omaha, which ranks next to Kansas City, St. Louis, and Chicago as a leading slaughtering center of the United States. The annual output of slaughtering houses is valued at $170,570,000. Next in importance are the products of flouring and grist mills, which are distributed quite largely in various parts of the State. Butter, cheese, and condensed milk are made in considerable quantities. Large interests are vested in the manufacture of starch, the production of beet sugar, and the canning of fruits and vegetables. Other manufactures include brick and tile, machinery, farming implements, stationery, clothing, bread, candies, radios, and automobile accessories.

TRANSPORTATION AND COMMERCE. None of the rivers within the State are navigable, but navigation facilities are provided by the Missouri, though it is not used extensively for that purpose. Numerous trunk railways traverse the State from east to west, including the Union Pacific, the Chicago, Rock Island and Pacific, the Chicago and Northwestern, and the Chicago, Burlington and Quincy railroads. These and other lines have many branches. The lines aggregate a total of 6,125 miles. Electric railways are maintained in many of the cities, whence branches are operated to urban and interurban points. The chief exports include horses, swine, sheep, cattle, flour, and dressed meat. Clothing, merchandise, hardware, and farming implements are imported.

GOVERNMENT. The constitution now in force was adopted in 1875. It vests the executive authority in the governor, lieutenant governor, secretary of State, auditor, treasurer, attorney-general, superintendent of public instruction, and commissioner of public lands and buildings, all of whom hold office for two years. The Legislature consists of 33 senators and 100 representatives, each elected for two years by popular vote. Meetings of the Legislature are held in the odd-numbered years, beginning the first Tuesday in January. The judicial power is vested in a supreme court, district courts, and county courts. Three judges comprise the supreme court, elected by popular vote for six years. Local government is by county and township, the principal officers being elected by popular vote for two years.

EDUCATION. Nebraska bears the distinction of having the lowest per cent. of illiteracy of any State in the Union, only 1.4 per cent. in 1920. The average length of the school term per year is 149 days, or seven months, and the total expenditures for the schools aggregate $21,456,479, an average of $40.75 per pupil on the daily average attendance. The schools are supported by local taxation, limited in each district to 25 mills, and by the State appropriation. The latter is derived from the interest on school lands leased and sold, and interest on school funds invested in bonds and warrants. Ultimately the permanent school fund will reach the sum of $25,000,000. The State has a very commendable free text-book system, under which it is made mandatory upon all districts to furnish text-books, without charge, to all children of school age attending school in the district. It is provided by law that each district expend not less than ten cents per pupil for school library books, hence the pupils have access to helpful reading matter, which is selected and cared for with the aid of a library commission and a reading circle board. The present administration in the office of public instruction has given encouragement to improvement in school architecture and schoolroom decorations, and means have been provided through its influence to further agricultural education and industrial training.

State teachers' colleges are maintained at Peru, Kearney, Chadron, and Wayne and normal training is provided at junior normal schools at Alliance, Alma, Broken Bow, Geneva, McCook, North Platte, O'Neill, and Valentine. The junior normal schools are organized and managed under the jurisdiction of the State superintendent. Normal training is likewise provided in a large number of the strongest high schools of the State, through which has been experienced an educational uplift of much value. At the head of the whole State system stands the University of Nebraska (q. v.), which is located at Lincoln. In addition to the institutions of learning supported by public funds, there are over fifty colleges, academies, and normal and business schools. These include Bellevue College (Presbyterian), Bellevue; Cotner University (Christian), Bethany; Creighton University (Catholic), Omaha; Doane College (Congregational), Crete; Midland College (Lutheran), Fremont; Grand Island College (Baptist), Grand Island; Hastings College (Presbyterian), Hastings; Nebraska Normal College (private), Wayne; Nebraska Wesleyan University (Methodist Episcopal), University Place; Union College (Adventist), College View; and York College (United Brethren), York.

Many charitable, penal, and benevolent institutions are maintained by the State. The asylums for the insane are at Lincoln and Norfolk, and the asylum for incurable insane is at Hastings. A soldiers' and sailors' home is maintained at Grand Island and another is at Milford, while the home for the friendless is at Lincoln. Kearney is the seat of the State Industrial School, and at Geneva is the Girls' Industrial School, while another industrial school is located at Milford. Lincoln is the seat of the State penitentiary; Beatrice, the seat of the institution for feeble-minded; and Omaha, the seat of the institution for deaf and dumb. Nebraska City has the State institution for the blind.

Inhabitants. The larger part of the inhabitants are in the eastern half of the State and 177,347 are of foreign birth, the majority of these being Germans. The population is 17 to the square mile. Lincoln, in the eastern part of the State, is the capital. Other important cities include Omaha, South Omaha, Beatrice, Grand Island, Fremont, Kearney, Hastings, Nebraska City, and Plattsmouth. In 1900 the State had 1,066,300 inhabitants. This included a colored population of 9,774, of which 3,322 were Indians and 6,279 were Negroes. Population, 1907, 1,068,849; in 1920, 1,295,502.

History. The region included in Nebraska was visited by the Spaniards under Coronado in 1541. Marquette made a plat of the Missouri and Platte rivers in 1673. It was secured by the United States in 1803 as a portion of the Louisiana Purchase. Lewis and Clark explored the eastern part in 1804 and 1805. It formed a part of the Northwest Territory for many years and, when the gold excitement of 1849 induced emigrants to go overland to California, settlements began to form. Nebraska Territory was formed in 1854, when it included the Dakotas, Wyoming, Montana, and part of Colorado. Stephen A. Douglas introduced the bill that organized the Territory. The provision in this bill for allowing the settlers to exercise their own choice in regard to the existence of slavery not only set aside the famous Missouri Compromise of 1820, but also aroused opposition in the northern states. The Territory was reduced to its present limits in 1863 and in 1867 the State was admitted. It has since made rapid industrial and educational development.

NEBRASKA, University of, a coeducational State institution at Lincoln, Neb., established in 1869. It embraces an industrial college, the graduate school, the college of literature, science and arts, a school of fine arts, the college of medicine, a school of music, and the college of law. This institution ranks with the best State universities in the Union. With it are affiliated the State museum, the superintendency of farmers' institutes, the botanical and geological surveys, and the United States Agricultural Experiment Station. It has a faculty of 400 professors and instructors and an average attendance of 6,800 students. The library contains 225,500 volumes.

NEBRASKA CITY, a city in Nebraska, county seat of Otoe County, 54 miles south of Omaha, near the Missouri River. It is on the Missouri Pacific and the Chicago, Burlington and Quincy railroads, and is surrounded by a fertile farming and dairying country. Near the city a fine steel railway bridge crosses the Missouri River. The manufactures include farming machinery, butter, candy, vitrified brick, tobacco products, overalls, carburetors, packed pork, and canned goods. It is an important grain and lumber market and has a large jobbing trade. The noteworthy buildings include the public library, the high school, the Federal building, and the State institution for the blind. Formerly the site was occupied by Fort Kearney. It was platted in 1855 and incorporated in 1871. Population, 1900, 7,380; in 1920, 6,279.

NEBRASKA STATE TEACHERS' COLLEGE, one of the State institutions for teachers in Nebraska, at Kearney. It was established by an act of the Legislature in 1903. An appropriation of $50,000 was set aside for the construction of a building and succeeding sessions have provided funds for maintenance. The first regular term opened in 1905. Three courses of study are offered. The teachers' training course, which admits teachers who hold first grade certificates, or have completed two years' of a regular high school course. This work consists of a review of the branches usually taught in the common schools of the State, together with the theory of education, the ele-

ments of psychology, and the observation of expert teaching in the model schools. The second course embraces five years, the last two of which are largely professional, including careful observation of expert teaching, conferences, methods, etc. In the senior year the students do practice teaching under the direction of critic teachers. The third department is that of commerce, aiming to fit teachers for giving instruction in commercial branches in high schools and colleges. This work covers three years of strictly commercial subjects and two years of professional study and practice teaching in the model school. Upon the completion of the teachers' training course students are granted elementary State certificates. They receive diplomas and life certificates on completing the higher course and the department of commerce.

The buildings are modern in every particular, being well constructed and supplied with modern equipments. Fifty-two teachers and professors constitute the faculty. The attendance consists of about 2,806 students.

NEBUCHADNEZZAR (nĕb-û-kăd-nĕz'zĕr), noted King of Babylon, who reigned from 604 to 561 B. C. He was the son of Nabopolassar, whom he succeeded as ruling sovereign, after that celebrated military hero had governed 21 years. Nabopolassar secured possession of the throne of Babylon by defeating the Assyrian monarch. During his reign of 21 years he established the basis of the greatest glory of Babylon. When Nebuchadnezzar attained the crown he entered upon a policy to recover provinces that had been lost to his kingdom. In the year 604 B. C. he defeated the Egyptian king, Pharaoh-Nécho, near the Euphrates. Subsequently he conquered Palestine and Syria and not only carried with him the wealth of Jerusalem, but took the Jewish people into captivity to require them to aid in rebuilding the cities of his own empire. In 585 he conquered Tyre and soon after led his army into Egypt. His latter years were spent in building vast canals, aqueducts, temples, fortifications, and palaces. The bricks used in constructing improvements bear his imprint, and from the large number found by making excavations it is certain that to him may be ascribed some of the most gigantic achievements of ancient rulers.

NEBULA (nĕb'û-lá), the name applied in astronomy to a slight cloudy patch of light, which retains its form except under examination through powerful telescopes, when portions of it appear as clusters of more or less distinct stars. About 11,000 nebulae are now recognized by astronomers. A few of the nebulae are visible to the naked eye, and by the use of the most powerful telescopes a number are resolvable. It is thought that telescopes still more powerful than are in use at present would make it possible to resolve those that now are apparently irresolvable. Nebulae are generally supposed to be gaseous bodies of unorganized stellar substances and the light is probably caused by the pressure of gases, though it has been impossible to determine the character of the gases. Five classes of nebulae are recognized: *stellar nebulae,* so called from having a condensation of light in their center; *planetary nebulae,* resembling somewhat the larger planets in appearance; *nebulae stars,* consisting of one

IDEAL NEBULAE.

or more stars surrounded by a circle of light; *irresolvable nebulae,* those in which no stars are observable even with the most powerful telescopes; and *resolvable nebulae,* which appear as a cluster of separate stars when examined by powerful instruments.

NEBULAR HYPOTHESIS (nĕb'û-lẽr hī-pŏth'ĕ-sĭs), a theory first suggested by William Herschel (q. v.), according to which the solar system existed originally in the form of a nebula and all bodies composing the solar system were originally in a nebular state. This theory was afterward approved and developed by La Place. Astronomers who support this theory hold that originally nebulous matter was scattered quite uniformly through all space, but later it began to gravitate toward certain centers. Rotation was established by particles moving toward these centers under the influence of gravity, which likewise produced the spherical form common to heavenly bodies. As heat was lost by radiation, the masses contracted in size, but increased in velocity. Rings were thrown off by reason of excessive velocity. In this way a whole system of planets was originated by the central body, or sun, and they in turn produced satellites by throwing off zones in a similar manner. That the sun produced our earth and other planets was believed by La Place. On the same hypothesis he reasoned that the rings of Saturn were thrown off by that planet, and that they will in the course of time form spherical satellites.

When it became possible by means of powerful telescopes to resolve many nebulae into stars, it was thought by some writers that the nebular hypothesis was destroyed, but, since some are absolutely irresolvable and are yet known to consist of gases, the nebular hypoth-

esis is based more firmly than ever, though minor points of detail in the original theory have been revised. Although the theory as a whole is interesting and plausible, it cannot be reckoned with such astronomical theories as gravitation, since the foundation of the latter is as strong as that of any of the truths known in science.

NECHO (nē'kō), or **Neku,** King of Egypt, son and successor of Psammetichus I., ruled from 610 until 594 B. C. He is mentioned in II Kings xxiii., 29, and Jeremiah xlvi., 2, and in the writings of Herodotus, the Greek historian. In 585 B. C. he attempted to join the Nile with the Red Sea by a canal, using the route that was adopted for the purpose at the time of the construction of the Suez Canal. He encouraged Greek colonization, extended his dominion into Asia as far as the Euphrates, defeated the Hebrews under Josiah at Megiddo, and was himself defeated by Nebuchadnezzar.

NECKAR (nĕk'ăr), a river of Germany. It rises in the Black Forest, near the source of the Danube and, after a tortuous course of 250 miles, joins the Rhine at Mannheim. The Neckar valley is highly fertile and contains the cities of Heilbronn, Tübingen, Heidelberg, Mannheim, and Cannstatt. It has been improved for navigation. Steamers ply as far as Cannstatt.

NECKER (nĕk'ĕr), **Jacques,** statesman and financier of France, born in Geneva, Switzerland, Sept. 30, 1732; died April 9, 1804. In 1750 he became a clerk of a banking establishment in Paris, and, after acquiring a fortune because of the Seven Years' War, he established the famous banking firm of Thelusson & Necker in Paris and London. Later he was made the representative from Geneva to the French court, and in 1775 attained a favorable reputation by publishing several able treatises on political economy in opposition to the free trade theories advanced by Turgot. In 1776 he negotiated a large loan of money to the French government, was made an assistant of finance in the same year, and in 1777 became general director of finance. His administration of the office was able and efficient. He funded the debt of France, readjusted taxes, established guaranteed annuities under the state, and provided a system of pawnshops under governmental supervision. By suppressing public abuses of state credit, he created a number of enemies at court and, when his "Compte Rendu," a financial statement, appeared in 1781, he was dismissed and retired to Switzerland. In 1788 he was recalled to the office, the recall being due chiefly to the incompetency of Calonne in managing the financial affairs of the nation. Soon after Necker advised that the states-general be summoned. His opposition to Mirabeau and Lafayette caused him to be dismissed and banished on July 11, 1789, but when the Bastille was stormed on July 14, the king found himself obliged to recall Necker. He was hailed with much rejoicing on his return to Paris and at once proceeded with marked vigor to restore order and financial stability. However, it was impossible for him to contend successfully in debate with Mirabeau and other leaders of the National Assembly, and, when that body rejected his proposition for a general loan, he resigned his office in September, 1790, and retired to his estate near Geneva. Madame de Staël, who was noted for display and brilliancy in French society, was the daughter of Necker.

NECROMANCY (nĕk'rō-măn-sy), the art of foretelling events or revealing hidden knowledge by consulting the spirits of the dead. It dates from remote antiquity, when it was prevalent among the credulous and superstitious. The Old Testament condemns it and severely criticizes those who practice this art. In Greece it was encouraged by the priests, who practiced it in a system of divination, and it was later taken up among the Romans. During the Middle Ages it was believed that the arts of necromancy were entirely natural and possible, but later it became associated with sorcery and witchcraft. See **Magic.**

NECROPOLIS (nĕ-krŏp'ō-lĭs), the name applied to the cemeteries maintained near ancient cities, particularly to a locality at Alexandria, Egypt, in which the bodies of the dead were received and embalmed. Later the term was applied to any burial grounds of antiquity, such as those extending along the Nile and in the vicinity of the Pyramids. Modern cemeteries located in or near towns and cities are sometimes known by the same name.

NECTAR (nĕk'tĕr), in Greek and Roman mythology, the drink of the gods, which, together with ambrosia, constituted their favorite food. It was thought that eagles and doves brought nectar and ambrosia, the drink and solid food of the gods, to the principal deities, and by means of it they were able to enjoy eternal existence and to maintain their personal vigor, beauty, and activity. Nectar is described by Homer as a beverage of crimson color, to which he ascribes the power of conferring perpetual youth to all who partake of it, while other writers ascribe to it a taste so delightful that it surpasses all conception.

NEEDLE, an instrument of steel for carrying a thread through fabric, leather, or other material. Needles are made in a variety of forms, such as are used for hand sewing, machine sewing, embroidery, netting, knitting, and other similar purposes. They are among the first implements invented by man. Those coming down to us as remains from antiquity are mostly of ivory, bone, and wood. Later they were made of bronze and other metals. At present fine steel is employed exclusively in making them for all kinds of sewing, but there are numerous sizes and shapes, and they are

applied to many different uses. The needle trade is one of vast importance, since there is a sale for this product in all the countries of the world, though the largest manufactures are

FIGURE *A.*

still in Europe. In the United States there are at present about fifty well-established manufactories of pins and needles, and the annual output aggregates a value of $2,125,000.

The first modern manufacture of steel needles began at Nuremberg, Germany, in 1370, when a large quantity of square-eyed instruments were made and put on the European market. Later manufactures were established in various countries, the most important of Great Britain being at Redditch, which is still the leading center of needle manufacture of that country. However, three-fourths of the world's supply is obtained from Altona and four other towns of Germany. With the invention of sewing machines there came a marked decrease in the consumption of needles for hand sewing, though needles for hand work are still used extensively in many countries and for various purposes where sewing machines are abundant. The name is applied to modifications of ordinary needles used in bookbinding, darning, sailmaking, loom weaving, and various instruments employed in surgery. It is the name of the pointed piece of steel balanced on a pivot in a magnetic compass and of various other objects.

As many styles and classes of needles are employed, the processes for making them are very

FIGURE *B.*

numerous. The first step involves cutting steel wire into lengths for two needles, and these are sharpened on both ends by placing about fifty at a time on a grindstone. When this has been done, the lengths are cut so as to form two needles. The heads are flattened by a hammer and the eyes are pierced with a punch as shown in figure *A,* after which the eyes are carefully trimmed and grooved, and the head is properly rounded. In the next step the needles are straightened by rolling in a mechanical appliance as shown in figure *B,* after which they are hardened, tempered, and polished. The polishing is effected by forming a bundle of needles and placing them in the scouring machine, this device being adjusted so that by moving them under pressure backward and forward they assume a white and silvery appearance, after which they are polished. Several stages are necessary in the polishing process, the first being effected with sand and emery and the next with a coarse canvas. The finishing polish is put on by means of a paste of putty powder. This process is merely one of many. In modern manufacture several hundred men are engaged in the different processes that a single needle undergoes. Ordinary needles for sewing are classed according to the relative fineness of their points as *sharps, betweens,* and *blunts.* The process of manufacture is so complicated that the labor involved possesses greater value than the material used, it being possible to make about 75,000 ordinary needles from five and a half pounds of wire.

NEEDLE GUN. See **Rifle.**

NEENAH (nē'nȧ), a city of Wisconsin, in Winnebago County, on the Fox River, fourteen miles north of Oshkosh. It is on the Wisconsin Central, the Chicago and Northwestern, and the Chicago, Milwaukee and Saint Paul railroads and is surrounded by a fertile agricultural country. The chief buildings include the opera house, the public library, and the high school. Being on Lake Winnebago, it is popular as a summer resort. The manufactures include flour, stoves, paper, machinery, and farming implements. It was settled in 1846 and incorporated in 1850. Population, 1920, 7,171.

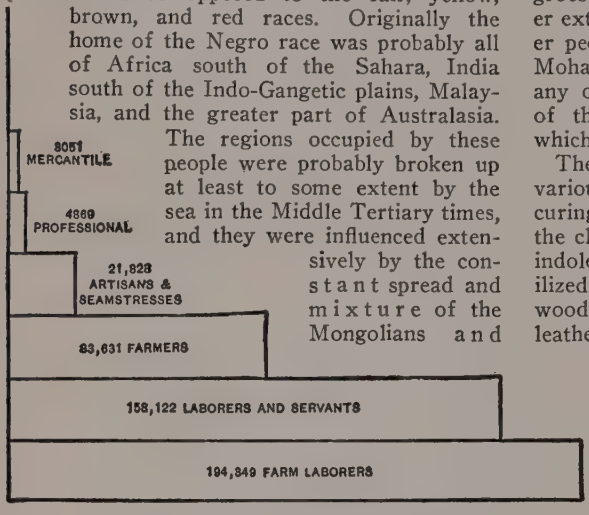
NEGAUNEE (nē-gą'nē), a city of Michigan, in Marquette County, about ten miles west of Marquette. It is on the Chicago and Northwestern and the Duluth, South Shore and Atlantic railroads. The site is on Iron Mountain, having an elevation of 1,250 feet above the surface of Lake Superior. The surrounding country is lumbering and iron mining. It has a prosperous trade in cereals, fruits, and merchandise. Negaunee was settled in 1870 and was incorporated three years later. Population, 1920, 7,419.

NEGLIGENCE (nĕg'lĭ-jens), in law, the omission to do something which ought to be done, or the act of doing something which should not be done. Negligence as thus defined may be said to consist of neglect in observing ordinary care and skill toward a person, whereby the person or property of the latter may suffer injury without contributary negligence on his part. The degrees of negligence are ordinary, slight, and gross. *Ordinary* negligence arises from the absence of ordinary care or diligence, while *slight* negligence is due to general carelessness, and *gross* negligence is the result of great carelessness. In general, negligence may be classed between the acts or omissions which constitute breaches of contract and those which constitute willful wrongs. In actions at law it is incumbent upon the plaintiff to present the

burden of proof to a jury. Most actions for negligence arise between employees and employers on account of defective machinery or appliances. Railway companies are sometimes charged with negligence with the operations of their roads and towns, cities, and counties for neglect in caring for bridges and streets. The negligence of a servant in most cases is chargeable to the master.

NEGRITOS (nē-grī'tōz), or **Negrillos**, a name of Spanish origin, commonly applied to a Negrolike class of people inhabiting many of the islands southeast of Asia, found especially in the interior of the Philippine Islands. Several closely related types are included with these races, of which the Aëtas, Ites Aigtas, Inaptas, and Igorrotes are the most numerous. These peoples are described as of exceedingly dark complexion, but not so black as that of the Negroes, with soft frizzled hair, a small nose, the lower part of the face projecting, and a small stature. The average height is about four feet eight inches. Large numbers of Negritos are still found in the interior of Luzón, Mindanao, Panay, Mindoro, and other islands. They support themselves chiefly by hunting and fruit culture. The language includes a number of different dialects.

NEGROES (nē'grōz), the name now generally applied to the distinctly dark-colored species of mankind as opposed to the fair, yellow, brown, and red races. Originally the home of the Negro race was probably all of Africa south of the Sahara, India south of the Indo-Gangetic plains, Malaysia, and the greater part of Australasia. The regions occupied by these people were probably broken up at least to some extent by the sea in the Middle Tertiary times, and they were influenced extensively by the constant spread and mixture of the Mongolians and other allied classes that are not properly included with the Negroes.



EMPLOYMENT OF NEGROES IN GEORGIA.

Among the principal characteristics, besides the color, in which the Negroes differ from the Caucasians, are that the brain weighs about 35 ounces instead of 45 ounces and their facial angle is 70° instead of 82°. In all classes the arm is abnormally long, sometimes reaching to the kneepan, and the cranial sutures close much earlier than in other races. The color of the skin is black, the nose is flat with dilated nostrils, the lips are thick and protruding, and the cranium is exceedingly thick. As a rule, the lower limbs are weak, the foot is flat with a low instep, the hair is woolly and black, the skin is soft and almost hairless, and the frame is of medium height.

The mental differences between the Negro and Caucasian races are fully as marked as the physical distinctions, though many notable exceptions have been found. As a whole, the race is not as nervous as the whites. It has remarkable aptness for music and distinctive ingenuity in forming mechanical devices. The race possesses a peaceable disposition and is remarkably receptive and imitative. It is noteworthy that Negroes are able to flourish in hot climates possessing elements entirely fatal to higher races, but they are less able to withstand severe cold. In civilized arts the typical Negroes of Africa have been influenced to a greater extent by the Mohammedans than by any other people. They exhibit more marked traits of Mohammedan civilization and customs than of any other class. The entire Negro population of the world is estimated at 160,000,000, of which about 25,000,000 are mongrels.

The Negroes in their native condition have various industries that they practice for procuring means of subsistence, though some of the classes are given to savagery, stupidity, and indolence. Those somewhat developed in civilized arts construct dwellings of stone and wood, work in metals, and manufacture fabrics, leather products, household utensils, and weapons for defense and the chase. In some regions agriculture is pursued successfully, live stock is reared, and commercial enterprises are developed. In the manufacture of musical instruments they display marked skill, largely because of their great fondness for music, and in their towns many mosques and other buildings of note are maintained. The whole race has been subjected extensively from an early date to impressment into slavery by other races more highly developed.

The modern institution of Negro slavery dates from 1503, when the Portuguese began to carry large numbers to the West Indies, and in 1511 the slave traffic was formally sanctioned by Ferdinand of Aragon. Negroes were first brought as slaves to North America in 1620 and Queen Elizabeth legalized slavery and the slave trade

both in England and in the colonies. The Congress of the United States prohibited the slave traffic in 1794, when importation to that country ceased, but importation to the West Indies and Brazil continued until 1840. The Negroes imported to the ports of the English colonies and the United States were mostly of the typical class from the African interior, but those taken to South America and the West Indies consisted largely of Zulus, Kaffirs, and Hottentots. In many regions the higher classes of Negroes made it a business to pursue and capture large numbers of neighboring clans, which they did to sell the captives into slavery. The practice finally developed into such moral degradation that the traffic was broken up entirely by the more civilized European peoples.

Many Negroes in North America have made remarkable advancement in the arts, sciences, and industries since their liberation from slavery. They have not only taken their place as citizens in many countries, but have gone into the schools, churches, industries, and positions of honor, and everywhere exhibit remarkable endurance and moral and mental aptitude. However, they are employed principally as farmers, servants, laborers, and farm laborers, as is shown in the accompanying illustration, which is a record of the employment of Negroes in the State of Georgia. The Negro population of the United States in 1790 was 757,000; in 1860, 4,442,000; in 1890, 7,488,788; in 1900, 8,840,789; and in 1920, 11,208,740. Of the entire population of the United States, 10.7 per cent. are Negroes. The excess of females is 54,347.

NEGROS (nā'grōs), one of the Philippine Islands, situated south of Panay, separated from Cebu by the Strait of Tanón, a channel from six to twenty miles wide. It is separated from Panay by the Strait of Guimarás. The area is 4,839 square miles, including a number of islands in the Sulu Sea, which separate Negros from Mindanao. A range of mountains extends nearly the entire length from north to south, but the coast regions are quite fertile. The productions consist of lumber, sugar, tobacco, sisal, and tropical fruits. Horses, cattle, swine, and cariboos are reared in abundance. Most of the natives speak the Visaya language. Among the towns are Bacólod, the capital, Bajo, Dumaguete, and Bacong. Population, 1922, 461,677.

NEHEMIAH (nē-hē-mī'ā), a distinguished Israelite, the son of Hakaliah. He is mentioned in the Bible as cupbearer to Artaxerxes Longimanus, King of Persia. In 444 B. C. he was sent as governor to Judah, where he rebuilt the city of Jerusalem, restored the walls and gates, and made it possible for the Levites to return from their banishment. It was difficult to restore prosperity, partly because the scattering of the Jewish people had caused them to fall into poverty, but chiefly for the reason that local dissensions were common. However, after heroic perseverance he restored the observance of the Sabbath and rebuilt and cleansed the temple. He prohibited intermarrying with the Gentiles and inaugurated civic reforms. The works of Nehemiah are recorded in the book that bears his name, which is partly ascribed to him and partly to others who compiled facts relating to the closing years of Nehemiah's life. The book was originally a part of Ezra, but later it was given its present independent position.

NEILL (nēl), **Edward Duffield,** educator and author, born in Philadelphia, Pa., Aug. 9, 1823; died Sept. 23, 1893. He graduated at Amherst College in 1842 and, after studying theology at Andover, entered the ministry. Subsequently he settled in the State of Minnesota, where he was superintendent of schools from 1858 until 1861 and chancellor of the State University from 1873 to 1883, and in the latter year became president of Macalester College, Minneapolis. His work as superintendent of public instruction was highly efficient. He gave to literature many excellent productions, among them "A Concise History of Minnesota," "English Colonization of America in the 17th Century," "Threads of Maryland Colonial History," and "Annals of Minnesota Historical Society."

NELSON, a river of Canada, rising in Lake Winnipeg, forming the lower course of the Saskatchewan. From Lake Winnipeg it first flows northward through a series of lakes, but later the course is toward the northeast into Hudson Bay. The total length is 412 miles. Navigation extends a distance of 125 miles, but by effecting projected improvements at its numerous rapids, which now retard navigation, its importance as a commercial avenue may be greatly facilitated. It discharges a large quantity of water and has a swift current.

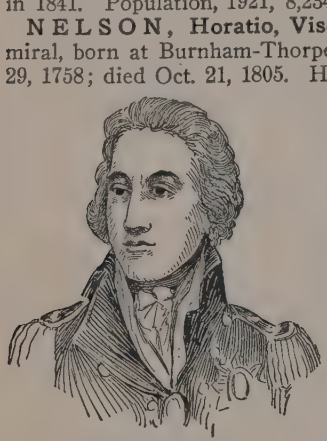
NELSON, a city of Canada, in British Columbia, on the Kootenay River, twenty miles west of Kootenay Lake. It is on the Canadian Pacific and other railways and is surrounded by a productive mining region. The chief buildings include the high school, the hospital, and the court house. It has electric lights, waterworks, and other public utilities. It is the seat of a match factory, shipyards, sawmills, and machine shops. The place has a large trade in merchandise and mining supplies. Population, 1901, 5,273; in 1921, 5,230.

NELSON, a town of England, in Lancashire, three miles northeast of Burnley. It has steam and electric railway facilities and manufactures of machinery, pottery, and silk and cotton goods. The chief buildings include a technical school, the townhall, and several churches. The municipality owns the waterworks, the gas and electric lighting plants, the cemetery, and a free library. It was incorporated in 1890. Population, 1921, 34,866.

NELSON, a town of New Zealand, capital of the province of Nelson, at the north end of

South Island. It has a deep harbor, railway facilities, and considerable trade. Steamers drawing 18 feet of water can safely reach the railway wharf. The manufactures include leather, pottery, and clothing. In the center of the town is a large Episcopal cathedral. Electric lighting, waterworks, and sewerage are among the public improvements. Nelson was founded in 1841. Population, 1921, 8,234.

NELSON, Horatio, Viscount, noted admiral, born at Burnham-Thorpe, England, Sept. 29, 1758; died Oct. 21, 1805. He was the son of Edmund Nelson, entered the royal navy at the age of twelve years as midshipman, and in 1773 accompanied the Arctic exploring expedition under Commodore Phipps. His industry and aptitude caused him to be promoted lieutenant in 1777, two years later he became post captain, and shortly after secured command of a frigate in the Leeward Islands. In 1793 he became commander of the *Agamemnon,* a vessel with 64 guns, and at once sailed for Corsica, where he aided in the sieges of Bastia and Calvi. On Feb. 14, 1797, he displayed marked efficiency at the Battle of Cape Saint Vincent, which was followed by a promotion to the rank of rear admiral, and the following year he obtained a famous victory over the French in the Battle of the Nile. This success caused him to be granted the title of Baron Nelson of the Nile and an annual pension of $10,000. Shortly after he succeeded in expelling the French from Naples, for which he was awarded an estate valued at $15,000 a year by the King of Naples and soon after was made Duke of Bronte. His next success was achieved in 1801, when he struggled with much bravery against the Danish fleet at Copenhagen, and by his masterful ability succeeded in shattering the naval forces of Denmark, which had long threatened the rise of English naval power.



HORATIO NELSON.

When war broke out anew against France and Spain, Nelson was given command of the naval forces in the Mediterranean, where he successfully blockaded Toulon for several years. On March 30, 1805, the French fleet effected its escape from the blockade and soon after joined the Spanish squadron that had been located at Cadiz. The two now sailed across the Atlantic to the West Indies, where Nelson pursued them, and to evade battle they hastened back to Europe, taking a position at the Spanish batteries at Cadiz. The Spanish fleet was commanded by Gravina and the French by Villeneuve. On Oct. 19 they ventured from their position at Cadiz and on the morning of Oct. 21 a decisive battle took place off Cape Trafalgar, in which the English fleet won a decisive victory. However, Nelson was wounded by a musket ball and died amid the most celebrated victory of his life. Nelson is described as a sailor of great foresight, intuitive decision, and promptness in carrying forward his designs. The remains were taken to England and buried in Saint Paul's Cathedral, where a beautiful monument has been erected to his memory.

NELSON, William, soldier, born in Maysville, Ky., in 1825; slain Sept. 29, 1862. In 1840 he became a member of the United States navy and soon after attained to the rank of master. He had charge of the gunboats on the Ohio River in 1861, but was made brigadier general of volunteers, and assigned to a command in Buell's army. In 1862 he became major general of volunteers. His death occurred at a hotel in Louisville, where he was shot by Gen. Jefferson C. Davis as the result of a personal quarrel.

NELSONVILLE, a city of Ohio, in Athens County, sixty miles southeast of Columbus, on the Hocking River and the Hocking Valley Railway. It is surrounded by a productive farming and coal-mining country. The manufactures include car wheels, machinery, shoes, brick, and clay products. It has a large trade in coal and merchandise. Population, 1900, 5,421; in 1920, 6,440.

NELUMBIUM (nē-lŭm′bĭ-ŭm), or **Nelumbo,** a genus of plants common to the fresh waters of temperate zones. They include many species that are remarkable for their beautiful flowers. The genus includes the *Egyptian lotus,* a plant once common in the valley of the Nile, but it is not abundant there at present. However, several closely allied species are found in India, China, the Malay Archipelago, and Australasia, where they grow vigorously in the fresh waters. The leaves of several of these plants contain medical properties serviceable for fever patients, while the seeds are eaten by the Hindus. The *lotus,* or *water chinquapin,* is considered sacred in many Asiatic countries, where it is used in religious rites, and the fibers derived from the stalk serve as a wick for lamps in Hindu temples. A variety of nelumbium found in the southern part of the United States produces rhizomes, from which tuberous roots develop that resemble the sweet potato. These tubers are favorite food products, especially among the Indians.

NEMEAN GAMES (nē′mē-ạn), the third of the national athletic and musical festivals of Greece, celebrated in the valley of Nemea of Argolis, in the Peloponnesus. The locality was so named from the Nemean lion, which was slain here by Hercules. These games were celebrated every two years, in midsummer, in the second and fourth year of each Olympiad. The

foundation of the games has been assigned to Hercules, but there is no history of them prior to 573 B. C. They were celebrated in eleven odes written by Pindar.

NEMESIS (nĕm'ĕ-sĭs), a Grecian divinity, represented by Hesiod as the daughter of Night. She is spoken of as the deity that adjusts human affairs by awarding to each individual the fate which his actions deserve. She is not mentioned by Homer, which is evidence that she was a conception of later times, when higher views of morality had obtained a foothold among the Greeks. In statuary she is represented as a beautiful woman of thoughtful and benign aspect and regal bearing. Her majestic brow is crowned with a diadem, which is taken as a fitting emblem of the manner of guiding, weighing, and measuring all human events. The Romans worshiped her as a divinity who possessed the power of averting the pernicious consequences of envy. In the ancient African city of Rhamnus a famous temple was constructed to Nemesis. It contained a celebrated statue of this goddess by Phidias, the remains of which were discovered quite recently.

NEOCENE (nē'ō-sēn), a term applied by the Geological Survey of the United States to the Miocene and Pliocene epochs in use among European geologists. It occupies the larger part of the Tertiary or Cenozoic period. Deposits of this epoch are found along the Atlantic coast, in the Llano Estacado of Texas, and in various sections of the Rocky Mountains.

NEOSHO (nē-ō'shō), a river of Kansas, rising in Morris County and having a general course toward the southeast. It crosses into Oklahoma, joining the Arkansas River near Fort Gibson. It has a total length of 325 miles. On its banks are the cities of Oswego and Emporia. The Cottonwood is its principal tributary.

NEPAL (nę-päl'), or **Nipal,** an independent kingdom of Asia, situated north of British India and south of Tibet. It occupies the southern range of the Himalayas for a distance of about 500 miles. The area is 54,000 square miles. A large part of the southern section is fertile and has a gently rolling surface. The mineral products include marble, jasper, copper, iron, sulphur, and rock crystal. Fine forests of oak, pine, sal, mimosa, and spruce abound in the lower slopes of the mountains. Rice, wheat, corn, pulse, potatoes, cotton, tobacco, tea, sugar cane, and fruits are the principal products. The manufactures embrace cotton and woolen goods, bell metal, ironware, copper products, brass vessels, clothing, and utensils. Cattle, buffaloes, horses, sheep, and swine are reared in abundance. The export and import trade with British India and Tibet is extensive. Highways and trade routes are maintained in the principal valleys. Nepal was occupied in the 14th century by the Hindus, but they were expelled in 1667 by a class of Mongolians. Most of the inhabitants are Gurkhas, who are a mixture of Aryans with the aborigines. The religion is Buddhism. Khatmandu is the capital and residence of the reigning sovereign. Population, 3,876,500.

NEPHRITE (nĕf'rīt), a mineral usually classed with jade, so named from being formerly worn as a remedy for kidney diseases. It has a greenish color, is hard and tenacious, and is used in making ornaments and utensils.

NEPOMUK, Saint John of, the patron saint of Bohemia, born near Pomuk, about 1330; suffered martyrdom in March, 1383. He secured a liberal education at the University of Prague, was ordained a priest, and served in that capacity in the diocese of Prague. In 1380 he was rector of the Church of Saint Gall and in 1381 became doctor of canon law. Later he secured an appointment as confessor to Sofia, wife of King Wenceslaus IV., and, being thought implicated with Archbishop John of Ganstein in his disputes with the king, he was cruelly tortured and drowned in the Moldau River. Pope Benedict XIII. canonized him in 1729. May 16 is the day on which his memory is commemorated with appropriate exercises.

NEPOS (nē'pŏs), **Cornelius,** author of ancient Rome, born in Verona, flourished about the middle of the 1st century B. C. Though a prolific writer, only a few of his works are extant. He is the author of an epitome of universal history, a collection of remarkable sayings and doings, and a number of biographies. His writings are noted for the pureness of their language. Many editions have been put out by publishers, including one of Aemilius Probus in the 4th century.

NEPTUNE (nĕp'tūn), the Roman god of the sea, who corresponded to the Greek divinity Poseidon. The Roman commanders invoked the favor of Neptune by sacrifices before venturing upon naval expeditions, his influence being held essential against both stormy seas and hostile armies. His temple at Rome was in the Campus Martius, and the festivals held in his honor were called *Neptunalia.* He is represented in art holding a three-pronged spear, or trident, in his hand, and his symbols are the horse and the dolphin. Artists portrayed him either in a state of calm or in agitation, corresponding to the aspect of the sea over which he presided.

NEPTUNE, a planet of our solar system, the most distant from the sun yet discovered, being 2,750,000,000 miles from that illuminary. It is invisible to the naked eye and appears in the telescope as a star of the eighth magnitude. Its distance from the earth is estimated at 2,630,000,000 miles. The diameter is about 36,750 miles, the inclination of its axis to the plane of the ecliptic is 1° 0′ 7″, and its year is 164.7 terrestrial years. The velocity with which it moves is estimated at only 12,000 miles per hour. Its density is a little less than that of water. Estimates place the light and heat received by it from the sun at about one-thousandth that re-

ceived by the earth. Neptune has one satellite. This satellite has a mean distance of 235,000 miles from the planet, and revolves around it in a period of 5 d. 21 hr. 2 min. 40 sec. Leverrier discovered Neptune on Sept. 20, 1846, but it had been suspected for many years that such a planet exists, from the fact that Uranus gives evidence by its perturbations of the existence of such a body.

NERBUDDA (nĕr-bŭd'dä), or **Narbada,** a large river of India, rises in the central plateau of that country, and after a course of 800 miles toward the west flows into the Gulf of Cambay. The Nerbudda valley is fertile, producing cereals, fruits, and vegetables in abundance. On its banks are the cities of Jabalpur, Burwani, and Barneh. It is navigable for ships of large size for a distance of fifty miles. The Hindus regard it sacred.

NEREIDS (nē'rē-ĭdz), in mythology, the daughters of the sea god Nereus and his wife Doris. They were sea nymphs and lived in the depths of the sea, whence they came to attend Neptune. In form they were human and they were noted for their friendship for mariners, particularly for the Argonauts. They were represented in statuary as beautiful maidens, riding on the waves of the sea or on the backs of dolphins.

NEREUS, in mythology, the son of Pontus and Gaea and the father of the Nereids. It is related that he was friendly and helpful to others, but Hercules was obliged to wrestle with him in order to learn the way to the Garden of the Hesperides. Artists represented him as seated upon the waves of the sea, usually as an old man wreathed in sedge.

NERO (nē'rō), **Lucius Domitius,** Roman emperor, son of Cneius Domitius Ahenobarbus and Aggrippina, daughter of Germanicus, born at Antium, Dec. 15, 37 A. D.; suicided June 9, 68 A. D. His mother afterward married Emperor Claudius, who adopted him, and his name was changed to Nero Claudius Caesar Drusus Germanicus. Subsequently Nero married Octavia, daughter of Emperor Claudius. The emperor abandoned Nero's mother, but the latter succeeded in removing him by poison, and in 54 Nero was confirmed as emperor by the senate and the provinces. Brittanicus, son of Claudius, was the rightful heir to the Roman throne, but Nero had him removed in the year 55 by poison, when the youth was fourteen years of age. This course he sought to justify by charging that he might become a dangerous rival.

NERO.

His mother at first exercised marked influence over his administration, but in 59 he caused her to be assassinated to please Poppaea Sabina, and, after divorcing and murdering his wife, he married Poppaea Sabina. While his private life was a disgrace from the first, public affairs were conducted with considerable vigor under the assistance of Seneca and Burrus, but in 64 a large part of Rome was destroyed by fire. This catastrophe laid waste two-thirds of the great city. Many writers have attributed the cause of the loss to Nero himself, but that sovereign charged the destruction to Christians and caused many of them to be tortured and killed.

Immediately after the burning of Rome Nero began to rebuild the city, devising for that purpose a vast system of public taxation. He caused the construction of a magnificent palace on Palatine Hill, which, from its beautiful ornamentation in gold, became known as the Golden House. In 65 a conspiracy was formed against him, but it was discovered before being carried out and resulted in the execution of Seneca and the poet Lucan. Shortly after he murdered his wife, Poppaea, put Antonia, daughter of Claudius, to death for refusing to marry him, and subsequently married Statilia Messalina, after causing the death of her husband. Nero had many accomplishments as a philosopher, poet, musician, and charioteer. By his skill in charioteering he gained applause in Italy, Greece, and the Spanish countries. The Gaelic and Spanish regions undertook to dispossess him in 68, and in the same year Galba caused the Praetorian guards to declare in his favor and against Nero. The senate at once proclaimed Nero an enemy to his country, and, to escape arrest, he committed suicide by stabbing himself, being at that time 31 years of age and having reigned 14 years. A revolt broke out soon after in Judaea, which was suppressed by Vespasian and ended in the conquest of Jerusalem.

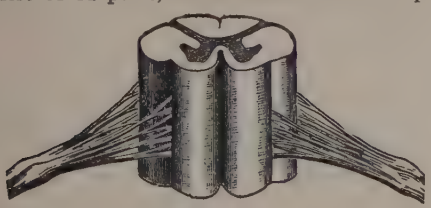
NERVA (nĕr'vä), **Marcus Cocceius,** Emperor of Rome, born in Umbria in 32 A. D.; died Jan. 25, 98. He was twice consul and was elected emperor in 96, succeeding Domitian, who was assassinated. His administration was popular with the people, since he diminished the public expenses and increased the resources of the empire. A conspiracy was formed against him in the second year of his reign, but the leader was discovered and banished. He adopted Trajan, then at the head of the army of Germany, who succeeded him as emperor.

NERVES, the cordlike structures composed of delicate filaments by which sensation or stimulative impulses are transmitted to and from the brain and other organs. In the animals belonging to the higher scale of life the nerves proceed from the brain and spinal cord, but in the lower animals they issue from the central ganglia. The simplest nerve system is found in the mollusca. In the radiata nerves are arranged in a circle around the mouth, from which they communi-

cate with the ganglia situated at the base of each ray. Insects possess nerve structure capable of producing sensory, reflex, and motor action, and as the scale of animal life rises there is a marked increase in the resemblance of nerves to those found in man, where their highest development and greatest sensitiveness are observed.

The nerves common to the human system are hard, silvery threads, composed of gray matter within and white matter without. They ramify all parts of the body, and, though often noticed very near each other, they are perfectly distinct and each conveys its own impression. The nerves carrying impressions to the brain are called *sensory* nerves, while those conveying orders of the mind to the different organs are designated *motory* nerves. If the motory nerves leading to a particular portion of the body be cut, all motion is destroyed, though sensation remains; and, if the sensory nerves be cut, feeling is lost, but motion remains. The nervous system is made up of nerve cells, nerve fibers, and nerve end organs. *Nerve cells* form the essential part of the brain and spinal cord, and from them as a center the nerve fibers run as fine threads to the cells of the body. The outer ends of the cells touching a company of cells, or *nerve end organs,* carry impressions to the central nerve cells. Although each cell in the body acts independently of the rest, yet the central nerve cells call all into active harmony. The three general classes of nerves are designated as *spinal, cranial,* and *sympathetic.*

The nerves that go to different organs run together in a bundle, which divides into its separate threads upon reaching its destined place. Each nerve thread is composed of a central fiber surrounded by a protected layer of tissue, and they vary in size according to the organ in which they have their seat. The *spinal nerves* consist of 31 pairs, which issue from the spinal



SECTION OF THE SPINAL CORD WITH NERVES.

cord through apertures provided for them in the backbone. Each of these nerves has two roots, called the *posterior* and the *anterior.* The posterior is the sensory influence and the anterior the motory one. Animals lose motion when the anterior root is cut and the power of feeling, when the posterior root is severed.

The *cranial nerves* consist of twelve pairs, which spring from the medulla oblongata and the lower part of the brain. They are shown in the accompanying illustration. The pair of *olfactory* nerves (1) are the nerves of smell, the pair of *optic* nerves (2) are the nerves of vision, and three pairs of *motores oculi* nerves (3, 4, and 6) serve to move the eyes. The pair of *trifacial* nerves (5), so named from its three branches, is the influence that controls the upper part of the face and the upper jaw and teeth, and branches into the lower jaw and mouth to form the nerve of taste, where it is known as the *gustatory* nerve. Expression is given to the face by the *facial* pair (7); the *auditory* pair (8) forms the nerves of hearing; the *glossopharyngeal* pair (9) connects with the membrane of the pharynx; the *pneumogastric* pair (10) presides

THE BRAIN.

over the stomach, lungs, larynx, liver, and heart; the *accessory* pair (11) regulates the vocal movements of the larynx; and the *hypoglossal* pair (12) gives motion to the tongue.

The nervous system is strengthened by healthful exercise and restful sleep. Nervous diseases result from inflammation of nerve substance, from general bad health, from intemperance, and from changes due to accidental injury of nerve fibers, cells, or centers. A total of 176 special nervous diseases has been classified. These include 21 functional, 28 brain, 40 spinal cord, and 87 peripheral diseases. The condition known as *nervousness* is largely temperamental. It causes a person to be unduly emotional and to lose self-possession. Nervousness is sometimes due to disease, excesses, and overwork.

NEST, a habitation or abode constructed by birds for incubating their eggs and rearing their young. Nests are of various construction and are greatly diversified in situation. Some birds, as the auks and stone curlews, do not construct nests, while some reptiles and mammals do, among them foxes, moles, weasels, rabbits, squirrels, mice, and many others. This is true also of many insects and crustaceans. A class of swallows build the famous edible nests which are abundant principally in China and the islands southeast of Asia. These nests are formed of small leaves, grasses, and fibers, and are fastened to rocks by a substance that exudes from the salivary glands under the tongue. This substance is gelatinous and is the portion eaten. These

nests are gathered by means of ladders, and the edible portions sell at from $1 to $35 per pound, depending upon the quality. It is estimated that fully 8,500,000 nests are gathered annually. The product is used chiefly by the wealthy for thickening soups. See **Birds' Nests.**

NESTS.

1, Oriole's nest; 2, Meadow Lark's nest; 3, Goldfinch's nest.

NESTOR (nĕs'tôr), a Greek hero mentioned in ancient legends. He was the son of Neleus and Chloris. His birthplace probably was in Messenian Pylos. It is recounted that he was a persuasive speaker and that he married Eurydice. He is noted as a valiant warrior against the Arcadians and Centaurs, and served as the counselor of the Grecian chiefs in the Trojan War. After the fall of Troy, he returned to Pylos, where he ruled over the people until his death.

NESTORIANS (nĕs-tō'rĭ-ạnz), a sect of Christians organized in Western Asia, so named from Nestorius, their founder. The first organization was formed about the middle of the 5th century, but the sect was repressed by the Romans. Persia gave protection to the organization and its creed was established by King Pherozes as the national faith. The fundamental doctrine was declared by a synod at Seleucia, where a resident patriarch was located. By the 12th century it had grown to an important community of ninety bishops, with a considerable number of communicants in Syria, Palestine, and Arabia. A division occurred in the 16th century, when many members began to call themselves Chaldaean Christians and allied themselves with the Roman Catholic Church. At present their principal seat of influence is in Kurdistan, but there are branches in India and other portions of Asia. The membership formerly was made up of a distinctively studious class of people, but during the ravages of Tamerlane they suffered materially, and in 1843 many of them fell as victims of persecutions by the Turks. A majority of the Nestorians are illiterate and poverty stricken, but they maintain several excellent institutions of learning and have many clergymen of eminent ability. The Persian branch of the Nestorian Church, about 30,000 persons, in 1898, joined the Orthodox Church of Russia and is now protected by that church.

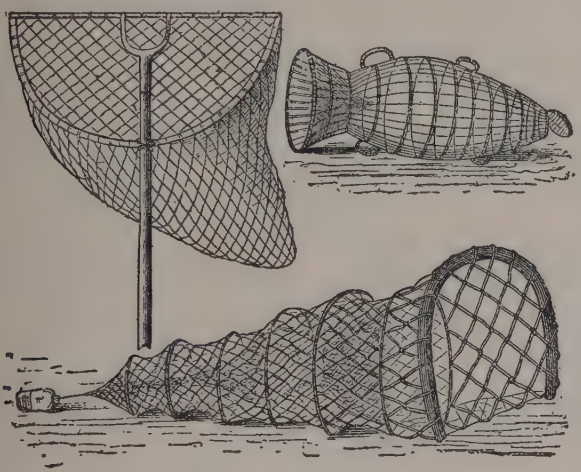
NET, a fabric of threads woven in open meshes, knotted firmly at the intersections, employed for ensnaring birds and fishes. A variety of nets are used for various other purposes, such as protecting the face and hands of bee keepers and for preventing birds and insects from destroying fruits. *Gill nets* and *seines* are the chief nets used in fishing. The former are set across waters frequented by fish which are caught in the meshes by running their heads through, the gills preventing their withdrawing them. The seine has a line of leaden weights at the lower side to hold it near the bottom of the water, and at the upper part is a line of corks to hold it in a perpendicular position. Fishers draw the seine near the shore by means of ropes fastened to the ends, and drag it to land to remove the fish that may be caught. The ancients used a variety of nets to catch animals, such as antelopes and gazelles, using a decoy to lure them near the entrance, when the watchers sprang suddenly forward to prevent escape. See illustration on following page.

NETHERLANDS (nĕth'ẽr-lạndz), or **Holland,** a constitutional kingdom of Europe, lying in the lowlands that border on the North Sea. It is bounded on the east by Germany, south by Belgium, and west and north by the North Sea. The area is 12,648 square miles, forming one of the smallest independent states of Europe. It has a coast line of 470 miles on the North Sea. The country is divided into eleven provinces as follows:

PROVINCES.	AREA, SQ. MI.	PROVINCES.	AREA, SQ. MI.
Utrecht	534	South Holland	1,166
Zeeland	690	Friesland	1,282
Groningen	790	Overyssel	1,291
Limburg	850	Gelderland	1,965
Drenthe	1,030	North Brabant	1,980
North Holland	1,070		

DESCRIPTION. The Netherlands is made up largely of the lowest part of the great plain of Northwestern Europe, hence the name. The natural drainage is inadequate to allow cultiva-

tion in all parts of the country, but a vast system of canals and dikes has been built to render cultivation of the soil possible. In some parts the surface is from ten to twenty feet below sea level, but these parts are protected from overflows by great embankments, while the water is pumped constantly from some distance below the surface by means of windmills. By this ingenious method it has been possible to transform marshes and lakes into the most fertile and productive regions of Europe, and the land surface has been enlarged by promoting extensive enterprises for reclaiming large surfaces formerly covered by the North Sea. The coast line of the Netherlands is exceedingly irregular, but the only inlet of considerable extent is the Zuyder Zee. Many fertile islands



NETS FOR CATCHING SMALL FISH.

are situated near the coast, all of which have been improved more or less by cultivation and the construction of embankments. The more elevated portions average about 150 feet above sea level, though in the southeast there are elevations fully 680 feet high. This once uninteresting and marshy region of Europe has been converted into a land of almost inexhaustible fertility, containing the richest alluvial deposits utilized in cultivation.

In the northern part are few streams and the country is characterized more or less by bogs and marshes. Nearly all of the drainage is toward the east, but the streams of importance are classed without exception as international. The Rhine is important as a highway between Germany and the sea. It enters the Netherlands from the west, but soon divides into numerous arms, forming a fertile and extensive delta. Chief of these arms are the Yssel, the Waal, and the Lek, all of which carry a large river trade. The Meuse, or Maas, enters the country from Belgium, and discharges into the Waal. The Scheldt, which enters the country from Belgium, has its delta mainly in the Netherlands. It is ascended by ocean vessels as far as Antwerp, but small boats reach the center of Belgium, and it is connected with other streams by a network of canals. Many small lakes are distributed throughout the country, though many have been drained and their beds have been converted into *polder,* as the redeemed land is called. Haarlem Lake, one of the largest to be drained, furnished 72 square miles of tillable soil. Zuyder Zee, the largest inlet, has been drained in some parts, but the work of redeeming practically the entire area of this lake or sea is in progress.

The climate is humid and changeable, but the range of temperature is small. In the spring the mean temperature is 49°, in July 64°, and in January about 35°. The heat of summer is not excessive and the cold of winter is not severe. Though rain falls on about two days in three throughout the year, the annual precipitation is not more than thirty inches. Damp and misty weather is frequent and sunshine prevails very rarely a week in duration. The climate is healthful as a whole, but marsh fevers are common to the boggy districts.

Fisheries. All of the streams and the coast waters are important for fishing. Many of the inhabitants are engaged in this industry, both in coast and deep-sea fishing. The herring is a prolific source of revenue and the annual catch is more important than that of any other fish. Sprats, or herrings, are taken in large numbers and oysters are obtained near the delta streams. Other catches include cod, anchovy, turbot, and salmon.

Agriculture. This branch has reached a very high state of development, but the yield is insufficient to supply the demand. The land may be divided into sandy and clay soils, nearly all of the reclaimed lands belonging to the latter. The sandy soils yield large quantities of rye, buckwheat, and potatoes, while the clay soils are best adapted to wheat, hops, tobacco, and sugar beets. However, rye, sugar beets, and vegetables are the leading crops. Other products include barley, oats, chicory, spelt, and flowers. Haarlem is the center of the flower industry, large quantities being cultivated in the vicinity and exported from this place. Much of the farming is in small tracts. Large interests are invested in orchards and gardens.

Few countries are as well adapted to the growth of grasses, since there is an abundance of moisture without excessive precipitation. On account of this the cattle industry has been developed on a very profitable basis, though cattle thrive best in the provinces bordering on the coast. Dairy farming has developed to a high degree, and cheese made in Holland is exported to the leading markets of the world. Gelderland and Friesland are noted for their superior breed of horses. North Holland has large inter-

ests in sheep raising. Poultry of all kinds is raised profitably, and large quantities of eggs are shipped to Germany and England. Other live stock includes goats and swine.

MINING. The country is not rich in the quantity and variety of minerals, since the surface is made up largely by recent alluvium formations. Various agencies, such as the sea, winds, vegetation, and drifts during the ice age, contributed to form the alluvial strata. Coal is mined in the vicinity of Limburg, but the fields are not extensive. Turf or peat is found in large quantities for fuel purposes. Bog iron is obtained in the eastern part. Though building stone is imported to a large extent, the country has clays which are valuable for the manufacture of brick, tile, and pottery.

MANUFACTURES. The Netherlands has few great manufacturing centers as compared with those in England and Germany, owing to the scarcity of coal and iron, although both are imported in large quantities. Rotterdam, The Hague, and Amsterdam have extensive car factories and railway machine shops. The manufacture of calico is material. This product is being made for exportation to Africa and Asiatic ports, and the number of spindles in operation is placed at 350,000. Linen is made largely in North Brabant, sailcloth in North and South Holland, and calicoes in Overyssel and North Brabant. Large dye works are located at Haarlem and Leyden, woolens are made extensively in Tilburg, and carpets are produced in large quantities at Deventer. Delft is noted for its production of fine glazed ware. Raw tobacco is imported in large quantities from the East Indies and is made into pipe tobacco and cigars. Sugar refineries are centered chiefly in the vicinity of Amsterdam. Other manufactures include stoneware, gin, glassware, velvets, silks, vinegar, and brick and tile.

TRANSPORTATION. Although the country has an extensive seacoast and great ship canals, railway building has received marked attention. Electric lines are numerous in the interurban districts and the railways aggregate a total of 3,100 miles, of which about one-half are owned by the state. The canals are 2,000 miles in extent, the canal system being relatively more important than the rivers. The North Sea Canal, extending from Amsterdam to the North Sea, has a length of fifteen miles. Between Amsterdam and Helder is the North Holland Canal, having a length of 48 miles. Some of the waterways are higher than the cultivated fields through which they pass.

COMMERCE. Commercially the country holds a high rank among the nations and a large share of the trade is maritime. It extends to all the continents, but the larger part of the exports go to Germany, Great Britain, Russia, Belgium, and the United States. Butter, cheese, oleomargarine, eggs, sugar, and live stock are the principal exports. The imports include leaf tobacco, wheat, petroleum, maize, and foodstuffs. Coal, metals, and timber are imported largely for use in the manufacturing enterprises. At present the imports exceed the exports, having a value of $992,500,000, while the exports aggregate $850,500,000.

EDUCATION. A splendid system of public schools is maintained, by which not only elementary instruction is provided, but there are articulated high schools, colleges, and four celebrated universities at Amsterdam, Leyden, Utrecht, and Groningen. School attendance is compulsory. The per cent. of illiteracy is remarkably low, only 2.8 per cent. of the inhabitants over ten years of age being unable to read and write. In the higher institutions classical studies are pursued, as well as courses in law, medicine, music, sciences, navigation, agriculture, horticulture, dairying, and various other industrial arts.

GOVERNMENT. The government is based upon a constitution revised in 1887, which makes the country a hereditary monarchy, with the executive authority vested in a king or queen. The legislative function is exercised by a Parliament of two chambers, known as the Upper Chamber and the Lower Chamber. In the former are fifty members elected by the provincial legislatures, while the latter has 100 members chosen by direct suffrage in the districts. A national supreme court is the highest judicial authority, and subordinate to it are five courts of appeal, 23 district courts, and 106 cantonal tribunals. The supreme court has its seat in The Hague.

The Reformed Lutheran Church is the religion of the royal family and of most the inhabitants, but entire religious liberty is granted to all. Fully three-fifths of the people are Protestants. Among the principal religions, aside from those already mentioned, are the Roman Catholic, Jansenists, and Jews. The right of suffrage is restricted to male citizens 23 years of age, paying at least ten guilders of tax. The guilder is the monetary unit, which is equivalent to 42 cents of American money.

COLONIES. The Netherlands take high rank among the colonial powers. Among the principal colonies are the Dutch East Indies, Surinam or Dutch Guiana, and the colony of Curaçao, which includes the islands of Curaçao, Saba, Buen Ayre, Aruba, Eustatius, and half of Saint Martin. These possessions have a total area of 782,850 square miles and a population of 36,875,350.

INHABITANTS. The native population of the Netherlands are descendants of the Batavians and Frisians, hence belong to the Teutonic stock. In the early historic period of Western Europe they were influenced by the Romans, but the latter were dispossessed by the Germans in the 5th century, when a large immigration of Saxons prevailed. Having more than 400 inhabitants to the square mile, the Netherlands takes rank among the most densely populated

countries of Europe. The country has a small emigration, about 1,800 per year, most of which is to the United States. Those of foreign birth residing within the country aggregate 52,500 persons, most of whom are Germans and Belgians. The Hague is the capital. Other cities of importance include Amsterdam, Rotterdam, Groningen, Arnhem, Haarlem, Utrecht, Leyden, and Maastricht. In 1906 the country had a population of 5,672,237; in 1922, 6,898,429.

Language and Literature. The official and literary language of the Netherlands is generally called Dutch, but by the people themselves it is known as *Nederduitsch,* a term used to distinguish it from the language of Germany, known as *Hochdeutsch.* The former is called Low Dutch and the latter High Dutch by some writers, though *Hollandisch,* or *Dietsch,* and German are the proper names, since Low Dutch applies more particularly to a peculiar dialect spoken by the people resident in Holstein and other adjacent provinces. Flemish is quite similar to the Dutch and both originated from the Germanic family of Indo-European languages.

The distinctly Dutch literature dates from the latter part of the 16th century, when the language was systematized and polished by such eminent writers as Spiegel, Coornhert, Van Marnix, and others. Pieter Hooft (1581-1647) gave a marked impetus to prose writing and produced several excellent dramas and poems. Joost van den Vondel (1587-1679) is noted as one of the most celebrated dramatists, giving to the Netherlands poetic productions that still take high rank. His contemporary, Jakob Cats (1577-1660), was a noted writer of maxims and his works are reckoned among the classics. Constantyn Huygens is one of the noted epigramists and satirists of Holland. Dirk Kampuhisen is a hymn writer, Brandt is celebrated as a historian, and Oudaan is famous as a political writer. The spread of French in the 17th century caused a temporary decline in Dutch literature, but Jacob Bellamy, in 1775, began its revival. Among the writers of the early part of the 19th century are the celebrated Bilderdijk, Helmers, and Tollens. The last named is the author of "Wintering of Hollanders in Nova-Zembla," an excellent descriptive poem, while Van Lennep is celebrated as a novelist. Other prominent writers of the Netherlands include Erasmus, Grotius, Boerhaave, Spinoza, Gronovius, and Lipsius.

History. The history of the Netherlands begins about the year 150 B. C., when that region was occupied by the Frisians. At the beginning of the Christian era it belonged partly to Belgium and partly to Germany. The Romans occupied it at the time of their western invasions, but in the early part of the 5th century A. D. it was conquered by the Franks. Charlemagne came into possession of the entire region in the 8th century, and in the 11th century most of the territory comprised independent duchies. In the 15th century it was acquired by the Austrian house of Hapsburg. Soon after it was made a possession of Spain and, when Charles V. abdicated in 1556, Philip of Spain became the ruling sovereign. Religious persecutions caused Zealand and Holland to rebel in 1576, and three years later the provinces of Gelderland, Zealand, Holland, Friesland, and Utrecht concluded the Treaty of Utrecht, by which they repudiated Spanish dominion, and William of Orange became the governor. This sovereign was assassinated July 10, 1584, but he was succeeded by other efficient leaders and Holland remained a powerful country until 1713, being in that period the most important commercial and maritime nation of the world.

The decline of the Netherlands as a world power may be ascribed to the rise of Spain and other nations that preyed upon it through a series of wars. Previous to that time it was not only a powerful nation in trade and colonization, but in the development of interior resources. It was in the dominion of the Netherlands that the pendulum clock, the first optical instruments, printing, and many other useful arts and devices were invented or first utilized. The armies of France made incursions through portions of the Netherlands in 1794 and several succeeding years. Louis Napoleon became its king in 1806 and in 1810 it was formally annexed to France.

The Orange family was recalled in 1814, at the downfall of Napoleon, and the provinces of Belgium and Holland were formed into the kingdom of the Netherlands. This union remained intact until 1830, when Belgium seceded to form a separate kingdom. An attempt to restore the union by King William I. was prevented by the intervention of the great powers, and in 1839 the governments of the separate countries were recognized practically as they exist at present. In 1840 the king abdicated, but he was immediately succeeded by his son as William II., and at his death in 1849 William III., his son, was crowned. That sovereign died on Nov. 23, 1890, and his daughter, Wilhelmina, became queen. The Hague was made the seat of the International Peace Conference in 1898 and was chosen as the permanent meeting place of the international arbitration tribunal established by that conference. The country has been unusually prosperous the past fifty years, showing remarkable growth in intelligence, industrial development, and wealth.

NETHERSOLE, Olga, actress, born in London, England, Jan. 18, 1870. She was educated privately in London and Germany. In 1888 she made her début at the Royal Adelphi Theater in London. Soon after she joined the company of John Hare at Garrick, where she played successfully in "The Profligate." She made a tour to Australia in 1890 and four years later starred in Canada and the United States. In America she became well known in the characters of *Carmen, Sapho,* and *Camille.* In 1899 she played successfully in New York City as

Paula in "The Second Mrs. Tanqueray." Her subsequent engagements in America were not as successful, although she won considerable applause.

NETTLE, a genus of plants widely distributed, embracing species which vary in size from small plants to large shrubs. Most of the species have alternate leaves and are of herbaceous structure, and many are covered with sharp tubular hairs. The hairs contain an acid fluid, which, when pressed by the exposed hand, is injected into the flesh and causes a painful wound. The flowers of most species are inconspicuous. They are unisexual, the male and female blossoms growing on the same or separate plants. Nettles serve a useful purpose in that their seeds are nutritious. The leaves are employed to make a beverage, known as *nettle beer,* and the stalks supply fibers of value in making cloth and yarn. The Chinese manufacture grass cloth from several species of the plant. Thread is spun from the product of several species in a number of European countries, and the tender shoots of young plants are used for preparing broth and porridge. Many species of nettles are common to North America, but they are widely distributed in all the continents and principal islands. *Nettle rash* is a disease of the skin which is quite similar to the result from nettle stings, but it is caused principally by indigestion. The *nettle tree* is a deciduous plant native to North America and other continents. It attains a height of 25 to 140 feet. The wood is of value in manufacturing.

NEUCHÂTEL (nē-shà-tĕl'), or **Neuenburg,** a city of Switzerland, capital of a province of the same name, on the northern shore of Lake Neuchâtel. The city has a beautiful location, is conveniently connected by railroads, and contains a number of scientific and educational institutions. Among the noteworthy buildings are the public library of 100,000 volumes, the museum of natural history, and the central railroad station. It has manufactures of cotton and woolen goods, jewelry, clocks, and machinery. A large majority of the inhabitants are French Protestants. Population, 1920, 31,453.

NEUCHÂTEL, Lake of, a fine body of water in Switzerland, about twenty miles west of Berne. It has an elevation of 1,425 feet above sea level and covers an area of 91 square miles. The valley surrounding the lake is highly fertile and is traversed by a number of railroad lines. Near it are the cities of Neuchâtel and Yverdon. The scenery attracts many tourists. Remains of lake dwellings have been discovered in it and in the small lake of Bienne, a short distance to the northeast. The lake receives the waters from the Reuse and the Thièle rivers. Its outlet is through Lake Bienne and the Aar River into the Rhine.

NEUMECKLENBURG (noi-mĕk'lĕn-bo͝org), an island of the Bismarck Archipelago, in the Pacific Ocean, about 350 miles northeast of New Guinea. It is of volcanic origin, but has considerable areas that are fertile and productive. Formerly it was called New Ireland, but it received its present name in 1884, when it was declared a protectorate of Germany. Fruit, grain, and timber are the chief products. The area is given at 4,950 square miles. It was made a mandatory of Great Britain in 1919. Population, 1922, 51,850.

NEURALGIA (nū-răl'jĭ-à), a disease resulting chiefly from overwork, debility, and general depression. It is produced directly by irritation of the trifacial nerves, or by sympathetic action with inflammation of the surrounding parts of various nerves. Neuralgia affecting the head is called *tic douloureux;* in the chest wall, *intercostal;* and in the breast, *angina pectoris.* The disease varies greatly in duration and degree, but it is most common to persons of thin blood. It often follows exposure to cold and wet, excessive indulgence in alcoholic drinks, or a wound or bruise. Neuralgia frequently accompanies rheumatism and sometimes results from sudden mental emotions. Generally it is a very painful disease and in many cases becomes chronic. Relief is obtained by an inhalation of chloroform. The treatment is generally of a tonic nature, involving the use of such remedies as quinine, bromide of potassium, and arsenic, though these should be given only under competent medical advice.

NEURASTHENIA (nū-răs-thē-nī'à), a disease of the nervous system, due chiefly to overwork and the use of stimulants and narcotics. In general it may be said to consist of nerve weakness, resulting from continuous strain and the fatigue that follows the excessive expenditure of nervous energy. Both sexes are about equally affected, though overstrain is the essential element causing the disease, which in many cases becomes chronic. Among the symptoms of the disorder are irritability, headache, sleeplessness, mental depression, impaired digestion, and sensations of general fatigue. Frequently some organic diseases are connected with neurasthenia, when a cure is rendered more difficult. Besides competent medical treatment in the disease, it is essential to remove the principal causes, to practice cleanliness and outdoor exercise, to devote a reasonable time to rest, and to obtain freedom from care.

NEURITIS (nū-rī'tĭs), an inflammation of a nerve, causing it to become red and swollen. The disease is due to injury of the nerve, or it may be caused by the action of lead, alcohol, or some other toxic agent or drug. Persons infected by typhoid fever or tuberculosis are subject to neuritis. The symptoms are severe local pain, partial loss of the sense of touch, and a reduction in the muscular powers. Neuritis is often the cause of the partial or total loss of a special nerve of sense, or the paralysis of a particular nerve.

NEUROPTERA (nū-rŏp'tē-rà), the name

of a group of insects, including species widely distributed in all the continents. They are characterized by powerful jaws, four membranous wings, and the absence of a sting or piercer. The head is large and distinct from the thorax, the antennae are slender, and the larvae are peculiarly voracious and carnivorous. They include species that live on trees, in the water, and in the ground. Among the familiar insects of this group are the dragon fly, white ant, antlion, wood tick, caddis fly, and May fly. The white ants and the wood ticks are injurious to vegetation, while most other insects of this group are beneficial in that they devour plant lice, aquatic and flying insects, and other pests.

NEUROSIS (nû-rō'sĭs), the name given to certain functional diseases of the nervous system, in which no change or alteration in the structure of nerves is discernable. Formerly the list of affections classed as neurosis was materially large, but improved methods of research have reduced them very considerably. The influence of poisons, such as alcohol or opium, especially when taken in excessive quantities, are prolific causes of the disease. The diseases usually considered neuroses include hysteria, epilepsy, catalepsy, and paralysis.

NEUSTRIA (nûs'trĭ-ȧ), the name applied to the western part of the Frankish Empire during the time of the Merovingian and the Carlovingian dynasties, from 511 to the beginning of the 10th century. It extended from the Meuse to the boundary of Austrasia, extending from the Atlantic to the Loire. Within this region were the towns of Tours, Paris, and Orleans. Later it was restricted to the region lying between the Loire and the Seine. When the maritime territory was ceded to the Normans, it received the name of Normandy.

NEUTRALITY (nû-trăl'ĭ-tў), in international law, the state of peace which a nation observes at the time two or more other nations are at war. In a state of complete neutrality the nation is neither the judge or party in the controversy. It may be the common friend of both belligerents, but in the matter of issue favors neither. The term *armed neutrality* is applied when a nation holds itself in readiness to assume a defensive position, maintaining an attitude in which it may repel any aggression that either of the belligerents may assume during the contest.

In ancient times the condition of neutrality as now understood did not exist, since wars were general and every state assumed either a friendly or hostile attitude toward one of the belligerents. The growth of nations and the development of civilization have made the neutral status quite important in modern governments. At present neutrality is looked upon as a privilege, and it is regarded quite important that the losses and evils of war be avoided. In many instances the neutral nations issue proclamations of neutrality, in which the position they take are clearly defined.

In 1856 a conference was held at Paris, France, at which the leading nations of Europe were represented, the purpose being to agree upon points of general interest that relate to the duty of neutral nations during the times others are involved in war. Among the principal questions settled was that of a neutral flag protecting the merchandise belonging to an enemy. It established the international law which requires that property of a neutral seized under the flag of the enemy be restored, and that merchandise belonging to the enemy and found under a neutral flag may be seized only in case it is contraband of war.

At the time the Alabama claims were arbitrated at Geneva, in 1872, the representatives of Great Britain and the United States agreed that a neutral government may not permit a belligerent to use its ports as a basis to obtain men or military supplies or to conduct naval operations. It was further agreed that such a government must use its offices and powers to prevent an enemy from using its ports to fit out a vessel in which to carry on war with its antagonists, provided the latter is at peace with the neutral power. Any violation of these conditions is looked upon as a direct act of war, and it is likely to involve the neutral state in difficulties as well as make it responsible for damages resulting from such acts. In general the neutral trade must be disturbed as little as possible in time of war.

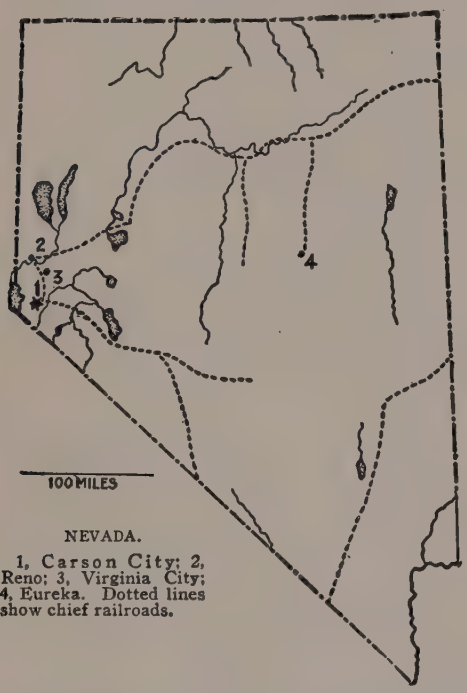
NEUVILLE (nē-vēl'), **Alphonse Marie de,** noted artist, born in Saint Omer, France, May 31, 1836; died in Paris, May 20, 1885. He was a student of Delacroix and developed a reputation as painter of battle scenes in the Crimean War. Later he accompanied the army to paint various scenes in the wars with Italy and Mexico and the Franco-German War. In the war with Germany he fought in the ranks as a soldier on the side of France, but he did this partly to learn regarding military life from actual experience, of which fact he took advantage in painting various notable incidents observed in celebrated engagements. Subsequently he prepared many illustrations for various books. The most notable of these were designed for Guizot's "History of France."

NEVA (nē'vȧ), a river of Russia, having its source in the southwestern corner of Lake Ladoga. It forms the outlet for that lake and Onega, Ilmen, and several others. In its course of forty miles it passes through Saint Petersburg and flows into the Gulf of Finland. An extensive system of canals enhances its commercial importance, facilitating water connection with many trade centers of Russia.

NEVADA (nē-vä'dȧ), a western state of the United States, popularly called the *Sagebrush State.* It is bounded on the north by Oregon and Idaho, east by Utah and Arizona, and south

and west by California. In size it takes fourth rank, being exceeded only by Montana, California, and Texas. It is about 485 miles from north to south, and the greatest breadth from east to west is 320 miles. The total area is 110,700 square miles, of which 960 square miles are water surface.

DESCRIPTION. The larger part of the State lies in the great basin between the Sierra Nevada and the Wasatch Mountains, a region which was once an inland sea, and its surface is traversed by numerous cross ranges. This basin may be said to be an extensive plateau, of which the average altitude is 4,000 feet above sea level. Many of the ranges run parallel to each other in a north and south direction, extending from 10



NEVADA.

1, Carson City; 2, Reno; 3, Virginia City; 4, Eureka. Dotted lines show chief railroads.

to 25 miles apart, but they are broken in many places by passes and valleys. Wheeler Peak, elevation 13,058 feet, located near the central part of the eastern boundary, is the highest peak in the State. The principal chains include the Hot Springs, Shell Creek, Toano Range, Granite Range, Meadow Valley, Shoshone, and Monte Cristo Mountains. Some of the valleys are highly fertile, while others are rocky and barren, the latter including Black Rock Desert, in the northern part.

The drainage of Nevada is partly by the Columbia river system and partly by that of the Colorado, but much of the interior has no outlet to the sea. The northern part is drained by the Owyhee, which discharges into the Snake, a tributary of the Columbia. In the extreme southern part the drainage is into the Colorado by the Virgin River and several other small streams. The interior is drained by the Humboldt into Humboldt Lake, by the Walker into Walker Lake, by the Carson into Carson Lake, by the Truckee into Pyramid Lake, and by the Reese, a river that disappears in the sand and gravel. Quinn River, in the northern part, disappears in Black Rock Desert. Pyramid Lake, the largest body of water in the State, is 10 miles wide and 35 miles long. Lake Tahoe, from which the Truckee River carries the overflow into Pyramid Lake, is 10 miles wide and 20 miles long. Hundreds of small lakes or sinks appear during the rainy season, but they dry up in the summer and form mud flats with more or less alkaline salts.

The climate is arid, pleasant, and healthful. Snow falls chiefly in the mountains, remaining on the higher summits throughout the year, and the winters are not unpleasant or severe. Some of the valleys are entirely without rains, while in other localities the precipitation ranges from six to 23 inches, being most abundant in a part of Washoe County, in the northern part of the State, where the rainfall is 22 inches. The minimum temperature in some places is 30° below zero, while the maximum ranges from 98° to 110° above. The mean annual temperature at Carson City is given at 54°, but there is a great variation with altitude and latitude.

MINING. The State had a period of great prosperity in the decade commencing with 1870, when the importance of its mining began to grow rapidly. The Comstock lode produced $38,000,000 worth of gold and silver bullion in a single year, and mining in its vicinity continues to be an important enterprise. At present the output of gold and silver is valued at $11,500,000. about one-fourth of which is silver. The larger part of the entire bullion output of the State is obtained at Goldfield and Tonopah. Copper is produced in large quantities, the output increasing very materially the past five years. Other minerals found extensively include salt, zinc, soda, coal, lead, sulphur, and borax. Building stones are found in large quantities in many parts of the State, especially granite, slate, and limestone. Clays valuable for pottery and brick are abundant.

AGRICULTURE. Evidences remain of the existence of abundant vegetation in early periods but at present the flora is limited, and irrigation must be depended upon largely to mature crops. Many species of cactus, bunch grass, sage brush, and other forms common to arid climates are abundant. The largest scope of irrigated surface is along the Humboldt River and in the western part of the State. At present about ten per cent. of the total area is included in farms. Hay is grown on a larger area than any other product and wheat is the most important cereal. Other crops include barley, oats, fruits, and vegetables. Gardening and fruit growing are profitable industries.

Much of the surface is naturally fertile, hence

many native grasses useful in stock raising are abundant. Some of the grasses ripen on the root in the fall, furnishing good grazing throughout the winter, though stock thrives best with some shelter during the colder months. Large interests are vested in sheep raising, and the annual wool clip is about 7,500,000 pounds. Cattle are grown principally for meat, but dairying is conducted in many localities. Other live stock includes horses, swine, mules, and poultry.

MANUFACTURING. The enterprises devoted to manufactures are principally in connection with the reduction and smelting of ores. Many railway repair shops are maintained, and considerable interests are vested in flour and grist mills. Other manufactures include butter, chemicals, utensils, and machinery. Cedar and other evergreen trees yield material for manufacturing enterprises.

TRANSPORTATION. Lines of the Southern Pacific and the Western Pacific railroads cross the northern part of the State, from which several branches extend to points inland. The line of the Los Angeles and Salt Lake Railway crosses the southern part, extending through it on the route from Los Angeles, Cal., to Salt Lake City, Utah. None of the streams is navigable, but a few of the lakes are used for local communication. The lines of railways, including branches, aggregate a total of 2,200 miles.

GOVERNMENT. The constitution was adopted by popular vote in 1864, at the time the State was admitted. It vests the executive authority in the governor, lieutenant governor, secretary, treasurer, comptroller, surveyor general, and attorney-general, each elected for four years. The Legislature is limited to 75 members, and the senators must not number less than one-third or more than one-half the representatives. The senators are elected for four and the representatives for two years, the elections being held on the Tuesday after the first Monday in November of even years. A supreme court, district courts, and justices of the peace constitute the judicial branch. Town and city courts may be established by the Legislature.

EDUCATION. Ample provisions were made for public schools at the time Nevada was organized as a Territory, when flourishing schools were opened at Virginia City, Gold Hill, Dayton, Carson City, and other places. The State University was first located at Elko, in the eastern part of the State, but it was afterward removed to Reno, where it occupies a fine location in the northern limits of the city. Flourishing high schools are located in all the towns and cities, the total number exceeding 16. The courses average twelve years, including eight years in the grades and four years in the high school proper. The school population is reported at more than 13,500, the ages ranging between six and eighteen years. In the payment of salaries to teachers the State takes a high rank, paying a monthly average of $112.51 to males and $67.96 to females. The schools are supported jointly by local taxation and by appropriations made by the State. The distribution of funds among the several counties of the State average $165,500, or about $12.25 for each census child. The school term averages 8.1 months per year. Reno has a hospital for those suffering with mental diseases, and a State prison and an orphans' home are located at Carson. Several schools for the Indians are maintained by the national government, including a boarding school for Indian children.

INHABITANTS. The State has the smallest population of the several states in the Union. A large majority of the people are more or less directly interested in mining and railroading. They consist chiefly of immigrants from other states, but include a considerable number of foreign birth. Carson City, in the western part of the State, is the capital. Other cities include Virginia City, Reno, Eureka, and Gold Hill. In 1900 the State had a population of 42,335. This included a total colored population of 6,930, of which 134 were Negroes, 228 Japanese, and 5,216 Indians. Population, 1920, 77,407.

HISTORY. The region included in Nevada was first visited by Francisco Garcés, a Franciscan friar, in 1775. Frémont, while on his route to California, in 1843, passed through it from east to west. It was included in the Mexican session of Feb. 2, 1848, when the United States acquired a large scope of country by the Treaty of Guadalupe Hidalgo. Settlements were made at various places by immigrants from states farther east as early as 1845, and four years later the Mormons established a trading post near the present site of Genoa. Silver was discovered in 1859, when it was included in Utah Territory, but it was organized as a separate Territory in 1861. The discovery of the Comstock lode caused a large number of miners and prospectors to settle in the Territory. It was admitted as a State in 1864. Subsequently the output of gold and silver declined materially, causing the State to lose in population, but in recent years it has shown considerable growth through the construction of railways and the development of mining and agriculture.

NEVADA, a city of Missouri, county seat of Vernon County, 98 miles south of Kansas City. It is on the Missouri Pacific and the Missouri, Kansas and Texas railroads. The city is surrounded by a rich agricultural country and in its vicinity are valuable deposits of coal. Among the noteworthy buildings are the Cottey College for Young Ladies, the State lunatic asylum, the high school, the public library, and the Roman Catholic convent school. It has manufactures of oil, brick, flour, lumber products, galvanized iron, and machinery. The general facilities include waterworks, street pavements, sanitary sewerage, and Lake Park. It was settled in 1830 and was chartered as a city in 1880. Population, 1900, 7,461; in 1920, 7,139.

NEVADA, University of, a co-educational State institution of Nevada, founded at Elko in 1873, but removed and formally reopened at Reno in 1886. It occupies a place at the head of the educational system of the State and comprises the college of arts and sciences, the college of agriculture, the college of engineering, the State experiment station, and the State hygienic laboratory. The curriculum includes military instruction. The United States Bureau of Mines Experiment Station is an affiliated organization. The university has a library of 50,500 volumes, and property valued at $923,968. It has a faculty of 75 members, including professors and instructors, and is attended by about 1,061 students.

NEVERS (nẹ-vâr'), a city of France, capital of the department of Nièvre, 140 miles southeast of Paris. It is at the confluence of the Loire and Nièvre rivers and is surrounded by a fertile plain. Some of the streets are narrow and irregular, but the newer portion is well and substantially built. The Church of Saint Étienne, the palace of justice, the lyceum, and the public library are among the chief buildings. Chemicals, porcelain, textiles, and ironware are manufactured. It has considerable trade in merchandise and grain. Population, 1916, 28,875.

NEVIN (nĕv'ĭn), **Ethelbert,** composer, born at Edgeworth, Pa., Nov. 25, 1862; died Feb. 17, 1901. He studied music in his native State and at Berlin, Germany. In 1887 he settled in Boston to devote his attention to composition, but spent much of his time in Europe after 1893. He was made an instructor in Yale University in 1900, where he remained active until his death. His productions include chiefly "Narcissus," "The Rosary," and "Water Sketches."

NEVIS, an island of the British West Indies, one of the Leeward Islands, two miles southeast of Saint Christopher. It is three miles wide by four miles long. The area is fifty square miles. The surface consists chiefly of an extinct volcano, which rises to a height of 3,596 feet, but the slopes are fertile and well cultivated. Limes, oranges, sugar, rum, and molasses are produced in abundance. Charlestown is the capital and principal town. Columbus discovered Nevis in 1498. It was settled by the English in 1628, but was taken by the French in 1706. In 1783 it was restored to the English. Nevis is the birthplace of Alexander Hamilton. Population, 1922, 12,947.

NEW ALBANY (ạl'bă-nĭ), a city of Indiana, county seat of Floyd County, on the Ohio River, opposite Louisville, Ky. It is on the Baltimore and Ohio, the Pennsylvania, the Southern, the Chicago, Indianapolis and Louisville, and other railroads. A railway bridge across the Ohio furnishes communication with Louisville. Among the features are the county courthouse, the Federal building, the city hall, the Culbertson Old Ladies Home, the public library, the high school, and the fair grounds. The electric street railway system extends to a number of suburbs. The manufactures include furniture, leather, boilers, chains, cigars, steamboats, packed meats, flour, stoves, hardware, edged tools, engines, and machinery. It has an extensive trade with ports on the Gulf and on the Mississippi. New Albany was platted in 1813 and incorporated as a city in 1839. Population, 1900, 20,628; in 1920, 22,992.

NEWARK (nū'ẽrk), a city of New Jersey, county seat of Essex County, on the Passaic River, eight miles west of New York City. It is on the Erie, the Lehigh Valley, the Central of New Jersey, the Pennsylvania, and other railroads. Newark is the largest city in the State. The site consists of 23 square miles, most of the area being level, but the residential district is on a beautifully elevated tract toward the west. Newark is distinctly a city of home-loving people and contains many beautiful homes of Newark and New York business men, and all parts of the urban and suburban districts are connected by a network of electric railways. Many of the streets are paved with granite or asphalt, and in the residential parts are beautiful parks and avenues of trees. Broad Street is the principal thoroughfare of the city. The public resorts include Lincoln, Washington, and Branch Brook parks.

The architecture is notably modern and substantial. Among the chief buildings is the public library, erected at a cost of $850,000. It is the seat of Newark College of Technology, Newark Academy, and New Jersey Law School. The Prudential Life Insurance building, the city hospital, the Newark Museum, the Saint Benedict's Academy, the Chamber of Commerce, and the Essex County Hospital for the Insane are among the prominent buildings. The public library has 315,000 volumes of books. The city contains statues of Gen. Philip Kearny and Frederick T. Frelinghuysen. Many charitable institutions and historical and civic societies are well represented.

Newark is prominent in manufacturing. It has about 1,865 manufacturing plants, which employ on an average 70,056 persons, and the annual output is greatly diversified. Practically all of the more important manufactures are represented, but those of the largest proportions include leather, machinery, furniture, tobacco, bread, paints, packed meat, cutlery, jewelry, boots and shoes, and chemicals. Transportation facilities are afforded by the Passaic River and Newark Bay, along which the city has an extensive water frontage. The municipality owns the waterworks, which represent an outlay of $9,400,000. Other public utilities include sewerage, electric and gas lighting, and a well-equipped fire department.

The first settlement on the site of Newark was made in 1666, when a trading post was established here by a company from Connecticut. Originally it was called Milford, but it was

renamed Newark in 1667. The town charter was granted in 1712 and it was incorporated as a city in 1836. A destructive fire did much damage to the city in 1836, which was followed by a business panic the next year. Population, 1905, 283,289; in 1920, 414,216.

NEWARK, a city in Ohio, county seat of Licking County, on the Ohio and Erie Canal and the Licking River, 32 miles east of Columbus. It is on the Pennsylvania and the Baltimore and Ohio railroads. The public utilities include electric lights and street railways, pavements, waterworks, sewerage, and a number of fine schools. Among the chief buildings are the county courthouse, the auditorium, the public library, and the high school. It has manufactures of railway cars, clothing, stoves, glass, engines, ironware, machinery, oil, brick, and paper. Extensive coal works are in its vicinity. It has a growing trade in farm produce, wool, and live stock. The place was settled in 1801 and became a city in 1839. Population, 1920, 26,718.

NEW BEDFORD, a city of Massachusetts, in Bristol County, on the estuary of the Acushnet River, 56 miles south of Boston. It is on the New York, New Haven and Hartford Railroad. New Bedford has an excellent harbor on Buzzards Bay, is conveniently connected by steamboat lines, and has an extensive system of electric street railways, which connect it with a number of adjacent cities. It is one of the most noted centers of cotton manufactures in the United States, having about 35 establishments which produce cotton goods of various kinds. Other manufactures include clothing, cordage, glass, leather, machinery, tin plate, soap, hardware, and utensils. The Wamsutta mill is one of the largest cotton manufactories in the world and has aided in making New Bedford famous.

The city has an area of twenty square miles. Many of the streets are paved with cement and macadam. Among the principal buildings are the county courthouse, the city hall, the public library, the Masonic Temple, the State armory, the Saint Joseph's and the Saint Luke's hospitals, and the First National Bank. Hazelwood, Brooklawn, Common, and Buttonwood parks are fine public grounds. New Bedford was an important whaling port in the early history of America. It was settled in 1652, when it formed part of Dartmouth, but was organized separately in 1787. The place was incorporated as a city in 1847. Population, 1905, 74,321; in 1925, 119,539.

NEW BERN, a city in North Carolina, county seat of Craven County, at the confluence of the Trent and Neuse rivers, 106 miles southeast of Raleigh. It is on the Atlantic Coast Line and the Norfolk Southern railroads and has a large coastwise trade. The noteworthy buildings include the county courthouse, the public library, and the Federal building. It has manufactures of turpentine, cotton-seed oil, furniture, tobacco products, candy, cotton goods, and gumwood plates and dishes. The fisheries in the vicinity are important. Waterworks, electric lighting, pavements, and sanitary sewerage are among the public utilities. Newbern was founded by Swiss settlers in 1701 and until 1793 it was the capital of the province of North Carolina. In 1862 it was captured for the Federals by General Burnside. Population, 1920, 12,198.

NEWBERRY, county seat of Newberry County, South Carolina, 42 miles northwest of Columbia, on the Southern and other railroads. It has cottonseed oil mills, machine shops, knitting mills, paving, and sanitary sewers. The chief buildings include the high school, courthouse, federal building, and Newberry College. Population, 1920, 5,894.

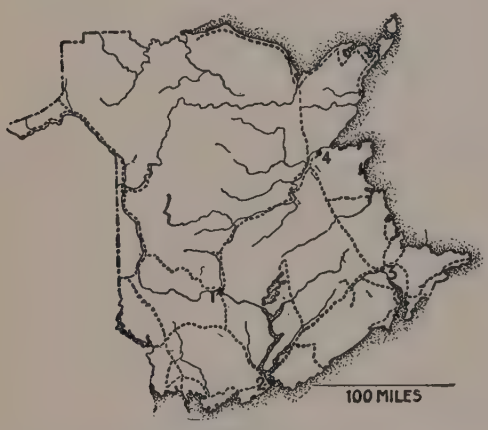
NEWBERRY (nū'bĕr-rĭ), **John Strong,** geologist and author, born in Windsor, Conn., Dec. 22, 1822; died in New Haven, Dec. 7, 1892. He studied medicine at the Cleveland Medical College. In 1857 he joined Lieutenant Ives to explore the Colorado River, and while there devoted ten months to making researches in the Grand Cañon. He spent the summer of 1859 in exploring northern Arizona and New Mexico and southern Colorado and Utah, and in 1861 engaged as a member of the United States sanitary commission, taking charge of important military work in the Mississippi valley. He was elected professor of geology at the Columbia School of Mines shortly after the close of the war, became State geologist of Ohio in 1869, and was engaged on the United States geological survey in 1884. His works include "Botany, Geology, and Zoölogy of Northern California and Oregon," "Rock Oils of Ohio," "The Colorado River Explored," "United States Sanitary Commission in the Valley of the Mississippi," "Iron Resources of the United States," "Fossil Fishes and Fossil Plants," "Palaeozoic Fishes of North America," "Geology of the San Juan Expedition," and "Our Later Extinct Floras."

NEW BRIGHTON (brī'tŭn), a borough of Pennsylvania, in Beaver County, on the Beaver River, 28 miles northwest of Pittsburg. It is on the Pennsylvania, the Pittsburg and Lake Erie, and other railroads. The surrounding country is agricultural and dairying and contains deposits of natural gas, petroleum, and coal. Among the noteworthy buildings are the public high school, the public art gallery, the Y. M. C. A. building and Beaver Valley Hospital. It has manufactures of lumber products, glass, machinery, twine, flour, wire, hardware, and vehicles. The municipality has waterworks and sanitary sewerage. Population, 1920, 9,361.

NEW BRITAIN, a city of Connecticut, in Hartford County, nine miles southwest of Hartford, on the New York, New Haven and Hartford Railroad. It is finely located and has good municipal improvements. Among the manufactures are hardware, musical instruments, cotton and woolen goods, jewelry, edged tools, cabinets, cutlery, locks, and machinery. The chief

buildings include the New Britain Institute, the high school, the public library, the city hall, and the Roman Catholic cathedral. Intercommunication is by a system of electric street railways. It was settled in 1687 and chartered as a city in 1871. Population, 1900, 25,998; in 1920, 59,316.

NEW BRUNSWICK, a Province of Canada, located on the northeastern coast of North America. It is bounded on the north by Quebec and Chaleur Bay, east by the Gulf of Saint Lawrence and Northumberland Strait, south by Nova Scotia and the Bay of Fundy, and west by the State of Maine and the Province of Quebec. The Saint John and the Saint Croix rivers form a part of the western boundary. Its extent from north to south is about 215 miles, which



NEW BRUNSWICK.

1, Fredericton; 2, Saint John; 3, Moncton; 4, Chatham. Chief railroads shown by dotted lines.

is a trifle more than its greatest distance from east to west. The coast line is quite irregular, including a total of 500 miles. The area is 28,200 square miles, of which 100 square miles are water surface.

DESCRIPTION. The surface is generally rolling, but the coast on the Gulf of Saint Lawrence is made up chiefly of low and sandy tracts. On the Bay of Fundy the coast is bold and rocky. A height of land extends from the northwestern part toward the southeast, dividing the head streams of the rivers that flow into the Gulf of Saint Lawrence from those that discharge into the Bay of Fundy. The ridges extending through the Province are outlying ranges of the Appalachian system and rise from 2,000 to 2,500 feet above the sea.

The western half of New Brunswick is drained by the Saint John River, which has a general course toward the southeast, discharging into the Bay of Fundy. It receives the inflow from the Green, Tobique, Aroostook, Keswick, and Nashwauk rivers, and discharges by an estuary nearly 50 miles long. A number of small streams drain the northeastern part into the Gulf of Saint Lawrence or its inlets, including the Restigouche and the Little Miramichi rivers. The southeastern part is drained by the Petitcodiac into Shepody Bay, an inlet from the Bay of Fundy. Though the Province has many lakes, Grand Lake, in the central part, is the only one of considerable size. It receives the inflow from the Salmon River and the discharge is carried by the Saint John.

The climate is marked by extremes of heat and cold, but they are more marked in the interior than on the coast. In winter the thermometer falls to 30° below zero and in summer it rises as high as 90° and even 98° above. Dense fogs and mists characterize the coast region, but the climate is healthful. The average rainfall is 40 inches for the Province, but it is greatest along the coast.

MINING. The Province has mineral resources of considerable value. Nickel and iron are found in paying quantities and coal is worked to some extent, but the mineral coal is confined largely to thin seams. Gypsum of a good grade is abundant and considerable quantities of antimony and manganese are obtained. Valuable clays and building stones are distributed in many parts of the Province. Stone valuable for grindstones and whetstones is quarried and shipped in large quantities.

FISHERIES. The fishing industry has been important from an early date in American history. Both coasts yield a large output and the Province usually holds second rank in the earnings from fisheries, being exceeded only by Nova Scotia. Among the principal catches are the herring, cod, sardine, salmon, smelt, and lobster. In smelt, herring, and sardine fishing New Brunswick exceeds all the other provinces. The fisheries yield returns annually valued at $4,125,000.

AGRICULTURE. The valleys and lowlands are fertile, but the hilly portions have a scant vegetation and do not yield extensively. Some of the coast lands are diked, especially at the head of the Bay of Fundy, where the soil is particularly fertile. Though agriculture is the leading occupation, it is still perceptible of greater development. Oats and hay are the principal products and buckwheat, potatoes, and wheat are cultivated to a considerable extent. Root crops, especially turnips, are grown on a large acreage. Smaller fruits yield good returns, though the larger varieties do not ripen before the occurrence of frosts, except in the valleys of the Saint John and other streams, where apples are grown.

Originally the Province was covered with timber, including such varieties as spruce, fir, tamarack, balsam, and many of the hard woods. These forests have been largely removed, hence the land is either tilled or used for pasturage. Sheep raising is a growing industry. Much attention is given to rearing cattle for meat and dairy products. Horses of a superior quality are grown for domestic use and exportation.

Manufactures and Commerce. New Brunswick has considerable material which is useful in manufacturing enterprises, such as lumber, coal, and metals. The fisheries yield a large output for canning and curing. Other manufactures include butter, cheese, furniture, clothing, and machinery.

Lumber is exported to European ports. The manufacture of wood pulp has assumed large proportions, hence furnishes an article for exportation. Other exports include wool, metals, lumber, and fresh and canned fish. A large part of the trade passes through the port of Saint John.

Transportation. Good harbors have been located and improved on both coasts and steamers ply regularly between them and the important cities of the Atlantic coast in Europe and America. Navigation is protected from the dangers of a foggy coast by an extensive system of lighthouses, fog horns, and fog whistles. Harbor and canal improvements facilitate a growing trade. Railway building has received considerable attention and the Province is traversed by several lines, including important extensions of the Canadian Pacific and the Canadian National railways. Branches extend from the main lines to many inland and coastal trade points, giving all sections reasonably good service. At present the total mileage is placed at 1,800 miles.

Government. The Lieutenant Governor and a council of seven members constitute the chief executive officers. The Lieutenant Governor is appointed for a term of five years by the Governor General of Canada. A single chamber of 48 members, elected for five years, constitutes the Legislature. The county councils have general powers to administer local administration, there being no local municipal councils as in some of the other provinces.

Education. The public educational institutions of New Brunswick include the University of New Brunswick, which maintains faculties of arts and of applied science, a provincial normal school and model school, about 70 high schools of various grades, and 1,700 common schools. All these from the university to the elementary schools are systematically articulated from grade to grade, and are under the supervision of a chief superintendent of education. The present incumbent of that office is W. S. Carter, M. A., LLD., who has filled the position for a number of years. The university and provincial Normal School are located at Fredericton, the capital of the Province.

About 67,500 pupils are in attendance at the public schools. The number of teachers is about 2,000. The total expenditure for educational purposes approximates $750,000, of which over one-third is drawn from the provincial revenues, about $100,000 is raised by assessment upon the several counties, and the remainder is obtained by assessment upon the local school districts. A movement has been inaugurated to improve rural education by uniting several school districts for the purpose of maintaining a central school. These consolidated schools have gardens attached and operate departments of manual training and household science. The children living at a distance from the schools are transported to and from the schools in vans. Those located at Kingston, Riverside, Hampton, and Florenceville are the first of these consolidated schools to be established. The taxable valuation of these four school districts is about $1,000,000. They are attended by over 750 students, the total cost per pupil chargeable to the district being $13.50.

Besides the public educational institutions, there are two denominational colleges and several private schools. The University of Mount Allison (Methodist) is situated at Sackville and the University of Saint Joseph's (Roman Catholic) is located at Memramcook, both in the County of Westmoreland, in the southeastern part of the Province. Saint John has a general hospital and Dorchester is the seat of the Dominion penitentiary. Other institutions include the asylums for the insane, an industrial home for juveniles, and hospitals for the deaf and dumb.

Inhabitants. The larger part of the population is of British origin, including a considerable proportion of Irish descent. In an early period of American history many French settled in the region and quite an element of French descent is included at present. About two-thirds of the inhabitants are Protestants, including principally Baptists, Anglicans, and Presbyterians, and nearly one-third are Roman Catholics. Fredericton, on the Saint John River, is the capital. Other cities include Saint John, Moncton, and Chatham. In 1921 the Province had a population of 387,876.

History. The region now included in New Brunswick was discovered by Sebastian Cabot in 1498. A colony was established by the French on the Bay of Chaleurs in 1639, whence the settlements extended along the coast and in the valley of the Miramichi River. From 1604 until 1713 it was united with Nova Scotia in the French colony of Acadia. In the latter year it was ceded by France to England under the Treaty of Utrecht. The boundaries were fixed by the Treaty of Paris in 1763 and in 1784 it was organized as a separate Province. After the Revolutionary War a large number of loyalists left the United States to settle in New Brunswick, and in 1867 it was made a Province of the Dominion of Canada.

NEW BRUNSWICK, a city of New Jersey, county seat of Middlesex County, on the Raritan River and on the Pennsylvania and the Raritan River railroads. It is connected by the Raritan and Delaware Canal. Among the manufactures are India-rubber goods, boots and shoes, carpets, hosiery, needles, paper, cotton and woolen goods, vehicles, and machinery. It

is the seat of Rutgers College, an institution founded in 1770, which carries advanced courses of study. New Brunswick contains a theological seminary of the Reformed Lutheran Church and the State Agricultural and Mechanical College. Other noteworthy buildings include the Sage Library, the Saint Agnes Academy, the city hall, the high school, and many churches. It has a large trade and modern municipal facilities, including electric street railways, waterworks, pavements, and electric lighting. The place was settled in 1681, when it was known as Prigmore's Swamp, and it was named New Brunswick in 1714. It was chartered as a city in 1784. Population, 1905, 23,133; in 1920, 32,779.

NEWBURGH, a city of New York, in Orange County, sixty miles north of New York City, on the Hudson River. It is on the Erie, the West Shore, and the New York Central railroads. The site is a beautiful tract of ground, rising about 300 feet above the river, and the slopes have many fine residences and yards. It has a large trade in coal and agricultural products. The noteworthy buildings include the public library, the Home for the Friendless, the Saint Luke's Home and Hospital, the city hall, and the high school. An extension in the river, known as Newburgh Bay, furnishes a deep water front. Among the manufactures are hats, overalls, yarns, fabrics, farming implements, flour, ironware, paint, soap, brushes, leather, and machinery. The surrounding country is farming, dairying, and fruit raising, and has productive coal deposits. Newburgh contains the Hasbrouck House, a structure of stone that served in 1782-83 as Washington's headquarters. This building is maintained by the State as a depository for historical relics. German Lutherans settled the place in 1709. It was chartered as a city in 1865. Population, 1905, 26,500; in 1925, 30,419.

NEWBURGH ADDRESSES, the name applied to several letters written at Newburgh, N. Y., shortly after the close of the Revolutionary War, while an American army was in camp on the Hudson River near Newburgh. These letters called attention to the failure of Congress to provide means to pay the soldiers and were published anonymously. They urged upon the soldiers not to disband until provision would be made for their pay, and suggested that a meeting should be called by the officers with the view of demanding a satisfactory settlement even if it were necessary to appeal "from the justice to the fears of the government." Congress soon after made a satisfactory settlement with the army. It was ultimately ascertained that Gen. John Armstrong was the author of the addresses.

NEWBURYPORT (nū'bĕr-ĭ-pōrt), a city of Massachusetts, in Essex County, on the Merrimac River, 36 miles northeast of Boston. It is on the Boston and Maine Railroad and has a good harbor on the river. Among the manufactures are silverware, boots and shoes, ovens, bread, heels, lamps, combs, cotton and woolen goods, ironware, and machinery. The public library was founded by Josiah Little in 1854 and contains 45,000 volumes. Other public institutions include the Old Ladies' Home, the Putnam Free School, the Y. M. C. A. Memorial Building, the Anna Jacques Hospital, and a marine museum. It has a statue of Washington, a suspension bridge, the Old South Church, and Washington Park. Electric street railways, waterworks, and a system of sanitary sewerage are among the improvements. The place was settled in 1635 and chartered as a city in 1851. Population, 1905, 14,673; in 1925, 15,656.

NEW CALEDONIA (kăl-ĕ-dō'nĭ-ȧ), an island in the Pacific Ocean, located 790 miles east of Australia, about midway between New Guinea and New Zealand. It is 238 miles long, and from five to thirty miles wide. The area is 6,584 square miles. New Caledonia is of volcanic origin, has mountain ranges that reach a height of 8,000 feet, and its coasts are surrounded by coral reefs and sand banks. Fertile valleys penetrate the mountain regions and its coast plains are also productive. The principal products include coffee, tobacco, sugar cane, lumber, maize, and many varieties of fruit. It has valuable mineral deposits, notably copper, cobalt, and ironstone. The inhabitants consist principally of natives resembling the Papuan race, but many are descendants of persons sent there by France as convicts. The natives are Canaques, who were formerly cannibals, but in the latter part of the last century they became quite highly civilized, and now engage in various industries, but principally in agriculture and sheep raising. The island was discovered in 1774 by Captain Cook and in 1853 became a possession of the French, who made it a penal settlement in 1872. Numea, on Numea Bay, is the capital. Population, 1922, 53,358.

NEWCASTLE, a city of New South Wales, at the mouth of the Hunter River, 102 miles northeast of Sydney, with which it is connected by lines of steamers and railways. The city is finely located on elevated ground, has regularly platted streets, and many of the thoroughfares are well paved with brick and macadam. The noteworthy buildings include the city hall, the public library, the courthouse, the high school, and a number of fine churches. It has a large trade in wool, grain, hides, and coal, and is the most important coaling station in the Southern Hemisphere. Among the industries are iron foundries, boot and shoe factories, copper-smelting works, flouring mills, machine shops, and shipbuilding yards. It has electric lighting and street railways, a system of public waterworks, and a deep and spacious harbor. Two breakwaters and two forts protect the harbor, which has an area of 540 acres. Population, 1922, including suburbs, 55,842.

NEW CASTLE, a city of Pennsylvania,

county seat of Lawrence County, on the Shenango River, fifty miles northwest of Pittsburg. It is on the Pennsylvania, the Erie, the Baltimore and Ohio, and other railroads. The surrounding country is farming and dairying, producing cereals, live stock, and dairy products. Among the noteworthy buildings are the public library, the high schools, the county courthouse, the Y. M. C. A., and many churches. It has extensive manufactures of street cars, flour, nails, tubes, rods, ironware, machinery, glass, clothing, and pottery. Its municipal facilities are modern, including pavements, waterworks, and electric street railways. It was settled in 1812 and chartered as a city in 1869. Population, 1900, 28,339; in 1920, 44,938.

NEWCASTLE-UPON-TYNE, a city and river port of England, on the Tyne River, sixty miles northeast of Liverpool. It is located within the confines of Northumberland County, but forms a county by itself. It has a fine site, being partly on an elevated plateau, and owes its prosperity largely to the immense deposits of coal in the vicinity and to its convenient harbor. The manufactures include steamships and other sailing vessels, locomotives, canon, marine engines, machinery, carriages, cables, clothing, anchors, sails, shot, harness, glass, cement, and earthenware. The city is extensively connected by steamboat and railway lines. It has a fine street car system, electric lighting, pavements, several well-improved parks, and fine schools and colleges. Among the noteworthy buildings are the Saint Mary Hospital, the Allan's endowed schools, the Mechanics' Institution, the Institute of Mining Engineers, a female orphan institution, the Trinity Almshouse, the Hospital of the Holy Jesus, the Saint Nicholas Cathedral, the Earl Grey Monument, the public library, and the Tyne Theater. The place was a military station at the time the Romans occupied Britain, having been fortified under Hadrian. Robert, the son of William the Conqueror, built a castle and fort here in 1080, when it was named Newcastle. It declared in favor of the king during the Civil War, when it was besieged by an army of Scots. Population, 1921, 266,671.

NEWCOMB (nū'kŭm), **Simon,** astronomer, born in Wallace, Nova Scotia, March 12, 1835; died July 10, 1909. He graduated at the Lawrence Scientific School and was appointed to teach mathematics in the United States navy. Later he secured an appointment to the Naval Observatory at Washington. For some time he was editor of the *American Journal of Mathematics* and the *Nautical Almanac.* Newcomb organized the government expedition that observed the transit of Venus in 1874, and in 1882 made an observation of the same phenomenon from the Cape of Good Hope. In 1884 he was elected to the chair of mathematics and astronomy in Johns Hopkins University, which he filled in connection with his other duties. His writings include many important articles on various scientific subjects and a large number of works in relation to the planets. Among the honors conferred upon him is the British Copley medal, awarded in 1890. He retired from the navy in 1897, but remained active in scientific pursuits.

NEWCOMEN (nū-kŏm'ĕn), **Thomas,** inventor, born in Devonshire, England, in 1663; died in 1729. He was a blacksmith at Dartmouth, where he experimented in a practical way with the view of devising a steam engine. In 1705 he took out a patent on an engine with which he demonstrated the feasibility of such a machine. Five years later he was joined by Captain Savery in taking out a patent on a larger steam engine, but this he greatly improved before 1719. His type resembles the style of the modern engine and is the first practical machine that was devised.

NEWELL (nū'ĕl), **Robert Henry,** author, born in New York City, Dec. 13, 1836; died July 11, 1901. His first work in literary pursuits was in connection with newspapers. In 1858 he became assistant editor of the New York *Mercury.* He held a similar position on the New York *World* from 1869 to 1872, and from 1874 until 1876 he was editor of *Hearth and Home.* At the time of the Civil War he published a series of papers under the name of *Orpheus C. Kerr,* meaning "office seeker," which attained such general popularity that he afterward published them as "Orpheus C. Kerr Papers." Among his publications are "Palace Beautiful and Other Poems," "The Martyr President," "Between Two Fires," "Studies in Stanzas," "Smoked Glass," and "There Was Once a Man."

NEW ENGLAND, the name applied collectively to the six northeastern states of the United States, including Maine, Vermont, New Hampshire, Massachusetts, Connecticut, and Rhode Island. The total area of these states, including a number of adjacent islands, is 67,384 square miles, and the population is equal to about one-thirteenth of that of the Union. The entire region was granted by James I., in 1606, to the Plymouth Company as North Virginia, but in 1614 John Smith made a map of the coast and named the region New England.

NEWFOUNDLAND (nū'fŭnd-lạnd), a British colony in North America, situated east of Canada, comprising the island of Newfoundland and the coast of Labrador. The island of Newfoundland is in the Atlantic Ocean, opposite the mouth of the Saint Lawrence River, and is separated from Quebec and Labrador by the Strait of Belle Isle, ten miles wide. In form it is somewhat triangular, measuring 315 miles from Cape Norman, its most northerly point, to Cape Ray, its extreme southwesterly point, while the extreme distance from east to west, that is, from Cape Spear to Cape Anguille, is 314 miles. The area of the island is 42,200 square miles and the coast of Labrador, which

belongs to it as a dependency, is usually reckoned at 120,000 square miles, but the boundary line at the west has not been definitely located. Extending eastward from the mainland toward Europe, the island is the nearest point at which to anchor the submarine telegraph lines.

DESCRIPTION. Numerous bays indent the coast, some of them extending into the interior as narrow fiords, and countless islands lie adjacent to the shores. Rocky headlands and bold cliffs characterize the shore, presenting rugged lines that rise abruptly from 200 to 400 feet high, and in some localities from 800 to 2,120 feet. The surface of the interior is hilly or undulating, assuming in some places ridges that terminate in the headlands. Long Range, the principal ridge, extends along the western coast, rising in peaks from 1,450 to 2,000 feet high. Vast stretches of forests are found inland, where the country is quite hilly.

Three rivers, the Gander, Exploits, and Humber, furnish the larger part of the drainage.

NEWFOUNDLAND.

1, Saint John's; 2, Harbor Grace; 3, Port aux Basques. Dotted lines indicate chief railways.

Both the Gander and the Exploits flow toward the northeast, discharging by estuaries into Notre Dame Bay. The Exploits is the largest stream, having a length of 200 miles and a basin of about 4,000 square miles. The Humber River, which is the only large stream that flows toward the west, passes through canyons of great depth and beauty. Other streams include the Victoria and the Saint George rivers. Many lakes abound in the interior, including Victoria, Grand Pond, Red Indian, and Great Gander lakes. The surface of Labrador, like that of Newfoundland, is hilly and undulating, and has a rocky and broken coast. See **Labrador.**

The climate is modified to a considerable extent by the Gulf Stream, but its modifying influence gives rise to extensive mists and fogs. Heavy gales and blizzards are not uncommon in winter, when the weather is cold. As a whole the climate is healthful and quite equable, but the interior of Labrador has cold and severe winters. The thermometer falls below zero quite frequently in the colder months and rises to 80° and 85° in the summer, when the climate resembles that of New Brunswick. In the southern part of Newfoundland the mean annual temperature is somewhat higher than in the adjacent parts of the neighboring continent, the thermometer rarely sinking below zero in winter and seldom rising above 80° in summer.

NATURAL RESOURCES. The fisheries have been of vast value from the early settlement of America, and at present are the principal resources of its inhabitants. Grand Banks, noted as a submarine plateau, lies southeast of the island, where vast schools of cod are found in the fishing season. Other extensive cod fisheries are along the coasts of the island and Labrador. The seal fisheries rank in importance next to those of the cod, but in value it is followed closely by the lobster catch. Other varieties taken in large numbers include the herring, salmon, and smelt. Nearly one-third of the inhabitants are engaged in the fisheries, and the value of the annual catch is placed at $9,500,000.

The colony is rich in mineral resources, especially in iron and copper. Both of these minerals are mined extensively on Bell Island, which is unusually rich in these minerals. Iron ore deposits are abundant on the western coast and in many places the deposits extend under the sea. Gypsum, lead, nickel, silver, and some gold are found. Coal fields exist in the vicinity of Saint George's Bay.

Forests of commercial value abound in many places, consisting chiefly of pine, spruce, fir, birch, tamarack, and red maple. The pine forests of the northern part are particularly valuable, where the timber industry yields a large output of lumber.

The soil is barren and rocky in many localities, while extensive marshes are found in the interior. Arable land in large tracts is located at the heads of the bays and along the river valleys, and a bonus is offered for cleared land by the government. Not more than one-tenth of the arable land is under cultivation. Potatoes and turnips are the principal crops, but oats, hay, and barley are grown successfully. Gardens are worked extensively by the fishermen, who cultivate many vegetables, especially cabbage. Cattle are reared profitably for meat and dairy products. Other domestic animals include horses, sheep, swine, and Newfoundland dogs. Many wild animals are abundant, such as the reindeer, caribou, bear, beaver, marten, wolf, and wild cat.

GOVERNMENT. The executive power is vested in a Governor, who is appointed by the British crown and assisted by an executive council of ten members. The legislative branch consists of a Legislature, made up of a council of not more than 24 members and an assembly of 36 representatives, the latter being

elected by manhood suffrage. At present the colony is divided into electoral districts, but distinct local governments are not maintained, owing to the concentration of population. For many years there has been more or less advocation with the view of incorporating the colony with the Dominion of Canada, but action has been postponed largely through unsettled points in regard to the fishing industry.

Commerce and Transportation. Foreign trade is chiefly with Canada, Great Britain, and the United States. Nearly half of the trade is with Canada. Among the chief exports are dried cod, whale oil, timber, and minerals. Flour, machinery, salt, meat, and petroleum are imported. Canned and cured fish, lumber products, clothing, butter and cheese, and farming and mining utensils are the chief manufactures. Communication is largely by water, owing to the extensive coast and many inlets that afford fine harbors. A government railway extends from the southwestern part in a direction toward the northeast, thence eastward beyond Great Gander Lake, and thence southeast to Saint John's. Several branches and private lines are operated, the total being 800 miles. Cable lines connect the island with the American continent. The first Atlantic cable line built to Europe extends from the island to Heart's Content Harbor, Ireland. The length of telegraph lines in operation is given at 3,125 miles.

Education. The schools are denominational, the school funds being appropriated according to the number of pupils of each denomination. At present 27 per cent. are Methodist, 33 per cent. are Anglicans, 34 per cent. are Roman Catholics, and the remainder belong to various Protestant denominations. The Governor appoints three superintendents of education, one for each denomination, who supervise and inspect the schools of their respective denominations. The Methodist and Anglican superintendents, every year, alternately, inspect the other Protestant schools, belonging chiefly to the Presbyterians and Congregationalists. The superintendents are required to visit annually, if possible, all the schools and training institutions of their respective denomination. They are required to present an annual report of the schools under their charge, to give advice to teachers and boards of education, and to utilize every available means to improve the character and efficiency of the educational work.

Although attendance is not compulsory, the public schools are well attended and very few private schools are maintained. Six colleges are located at Saint John's, belonging respectively to the United Church, Roman Catholics, Anglicans, and the other Protestant denominations. These institutions prepare students for the examinations of the University of London, England. Ample provisions have been made in support of charities and for correctional purposes. Colonial institutions for the deaf and dumb, incorrigible, insane, and other public charges are maintained at public expense, most of which are located at Saint John's.

Inhabitants. Fully 96 per cent. of the inhabitants are native born and are chiefly of Irish, English, Scotch, and French descent. A majority are Protestants, belonging chiefly to the United and Anglican churches, but the Roman Catholics have a large membership. Saint John's, in the southeastern part, is the capital and largest city. Other cities include Harbor Grace, Bonavista, Carbonear, and Twillingate. Port aux Basques is important as a port of entry. The population of Labrador is 3,621, partly Esquimos, and during the summer about 30,000 fishermen exploit the region. In 1911 the island had 239,027 inhabitants. The total population of the colony in 1921 was 262,966.

History. The Northmen probably explored Newfoundland in the year 1000, when, according to Islandic *Sagas,* it was visited by Lief Eric. It was discovered by John Cabot in 1497 and was visited by Sebastian Cabot the following year. Fishermen from France were attracted by the value of its fisheries, but the settlements made by them were not permanent. Sir Humphrey Gilbert took formal possession of it in the name of Queen Elizabeth in 1583, but a long struggle for supremacy between the English and French interfered with the development of settlements. The first English settlement was founded about 1621 and it remained constantly under British control. The Treaty of Utrecht, in 1713, gave the French the right to fish along its coasts and to occupy a portion of the coastal plains for curing purposes. Its government was administered directly from England until 1833, when a more satisfactory form was granted, and a second modification was made in 1855, by which greater powers were vested in the local authorities.

NEWFOUNDLAND DOG, a large and intelligent dog originated in Newfoundland, though not an aboriginal of that island. This dog is about 27 inches high at the shoulders, weighs from 80 to 100 pounds, and has a double coat of warm and thick hair, consisting of a short woolly fur, through which the longer hairs protrude. The color is almost uniformly black and white, or entirely black. The head is broad and massive, the eyes are small and deeply set, and the legs and feet are powerful. This dog is excellent for watching and is used extensively in cold countries as a beast of burden and to draw sledges. It can be trained for swimming, hence is useful in saving the lives of human beings near the coast or in inland waters.

NEWGATE, a London prison of historic interest, located at the west end of Newgate Street, opposite the Old Bailey. The name was derived from its being at one time a new gate; the name was compounded prior to 1218. It is no longer used as a prison proper, but serves

as a place to detain prisoners temporarily, or until they are tried in the central criminal court near by. Newgate is the place where execution by hanging is carried out. The walls are high and windowless.

NEW GUINEA (gĭn'ē), or **Papua**, a large island situated north of Australia, separated from that continent by Torres Strait. The island was probably connected with Australia at an early date, since the strait is not more than 300 feet deep. It has a length of nearly 1,500 miles and is from 22 to 430 miles wide. The area is estimated at 310,000 square miles, thus being the largest island in the world. Careful explorations of the interior were not made until within recent years. Chains of mountains trend across it, including the Bismarck ranges, which attain to a height of about 20,000 feet. In various parts are rocky formations that render cultivation impossible, but vast tracts of it are fertile. It has extensive forests of tropical trees, many of which rank among the largest in the world. The animals include lizards, crocodiles, opossums, wild hogs, tree kangaroos, serpents, and many species of beautiful and curious birds, including pigeons, parrots, birds of paradise, kingfishers, and the cassowary.

The climate is warm and damp, rainfall is abundant, and in many parts the vegetable growths are very luxuriant. Among the principal coast indentations that furnish good harbors are the Gulf of Papua, Huon Gulf, Humboldt Bay, and Geelvink Bay. The chief rivers include the Amberno and Fly, these being navigable for some distance at all times of the year, but during the rainy season they rise considerably and form an extensive navigation area. Papuan natives make up the principal part of the inhabitants, but there are also a considerable number of Malays, Karons, and eastern Polynesians. The principal products include lumber, sweet potatoes, rice, tobacco, yams, sugar, rum, maize, wheat, millet, sago, cocoa, oranges, and other species of tropical fruits.

New Guinea formerly belonged to three European powers—Germany, England, and Holland—which occupied respectively Kaiser Wilhelm's Land, British Guinea, and Dutch Guinea. *Kaiser Wilhelm's Land* occupies the northeastern part. It has an area of about 70,200 square miles and a population of 175,000. The region was formerly governed by the German New Guinea Company and an imperial commissioner, but in 1919 it was placed directly under Australian control, and with it are included the islands of the Bismarck Archipelago. Stations are maintained at Constantinhafen, Finschafen, Hatzfeldhafen, and elsewhere, and the exports embrace principally lumber, bamboo, dates, tobacco, and tropical fruits. *British Guinea* embraces an area of 88,500 square miles and a population of 360,000. The principal settlement is at Port Moresby and the exports consist of pearl shells, tobacco, areca, cabinet woods, and tropical fruits. *Dutch Guinea* has an area of 151,500 square miles, about one-half of the island, and the government is administered from the settlement at Ternate. The colony embraces the western portion of the island. Its soil is less fertile than the regions under colonial English control, though there are valuable forests and extensive deposits of minerals. The population is 212,000, thus making the population of the entire island about 750,000.

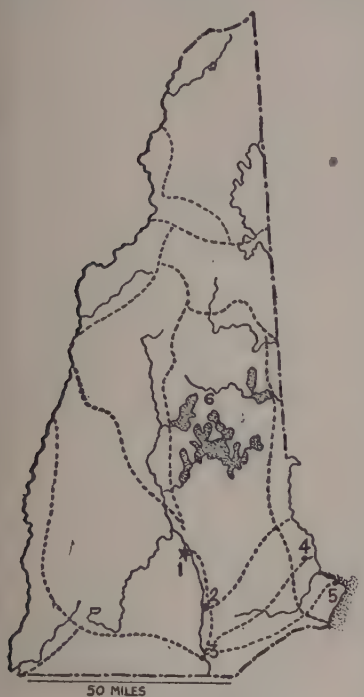
New Guinea was discovered by the Portuguese in 1511 and was so named by Iñigo Ortiz de Rez, who visited the island in 1546. Dutch navigators landed to obtain fresh water in 1676, but little attention was paid to the island until in 1828, when the Dutch formed a settlement on its western coast. Progress was extremely slow until in 1858, when the Dutch established a colony that has since become prosperous. They have made extensive explorations along the coast and in the interior. England annexed the southeastern part in 1883 and occupied the German possessions in 1914, over which Australia obtained a mandatory in 1919.

NEW HAMPSHIRE (hămp'shĭr), one of the thirteen original states of the United States, belonging to the New England group, popularly called the *Granite State*. It is bounded on the north by Quebec, east by Maine and the Atlantic Ocean, south by Massachusetts, and west by Vermont, from which it is separated by the Connecticut River. A part of the eastern boundary is formed by the Salmon Falls River. The length from north to south is 178 miles, its greatest width is 98 miles, and the area is 9,305 square miles.

Description. The general slope of the surface is toward the south. It has an average elevation of about 1,190 feet. A large section in the northern part is mountainous, while low hills and broad valleys characterize the central and southern sections. The White Mountains occupy the north central part and culminate in Mount Washington, with an elevation of 6,295 feet. These highlands have an altitude ranging from 2,000 to 3,000 feet and cover an area of 1,400 square miles. They belong to the Appalachian system and consist of the White and Franconia ranges, being divided by the Notch, as the valleys of the Saco and the Ammonoosuc rivers are called. The White Range is picturesque and is sometimes called the "Switzerland of America." In the Franconia Range is a profile of projecting rocks, known as the "Old Man of the Mountain," which is visited by tourists during the summer. Forests of considerable value cover the highlands, consisting chiefly of white pine, spruce, oak, beech, and hickory.

The drainage is principally by the Connecticut and its tributaries, which include the Ashuelot, Sugar, Ammonoosuc, and Mohawk rivers. A large part of the northern section is drained by the Androscoggin, which carries the outflow from Lake Umbagog and after an irregular

course passes the border into Maine. Somewhat farther south is the Saco, which receives the inflow from several streams and passes eastward into Maine. The Merrimac, which rises by several head streams in the Franconia Range, flows southward into Massachusetts, receiving in its course the Contoocook, Piscataqua, and Southegan rivers. Many of the streams are noted for the swiftness of their currents, hence are of vast utility in furnishing power for various manufacturing enterprises. Numerous lakes are located within the State, of which Lake Winnipiseogee is the largest, being six miles wide and eighteen miles long. Other lakes in the central part include Squam, Newfound, and Sunapee. Lake Umbagog is in the northern part, on the boundary with Maine.



NEW HAMPSHIRE.

1, Concord; 2, Manchester; 3, Nashua; 4, Dover; 5, Portsmouth. Chief railroads shown by dotted lines.

The climate is healthful and agreeable, although it is quite cold in the winter. Snow falls to a great depth in the northern section, where the climate is colder than in the southern part. The mean annual temperature is given at 49°, while the extremes range from a few degrees below zero to 95° above. All parts of the State have an abundance of rainfall, which averages 45 inches, but is somewhat heavier in the highlands.

Mining. Copper is mined to some extent and ranks among the more important metals. Small quantities of gold and silver are found and some interests are vested in mining lead, tin, iron, and zinc. A superior quality of stone for making whetstones is found in the White Mountains, where it is quarried extensively. The State produces about three-fourths of the mica obtained in the United States and is noted for its extensive and valuable deposits of granite, large quantities being quarried for monuments and building purposes. Clays suitable for brick and pottery are abundant. Other minerals include ocher, precious stones, and mineral waters.

Agriculture. Less than one-third of the surface is utilized in farming, much of it being too broken for agriculture. The farms average 123 acres and are worked largely by the owners. Hay and forage crops are grown on a larger acreage than all other products combined, the yield being utilized in the live-stock industry. Other crops include corn, oats, potatoes, barley, and buckwheat. Apples are a source of much revenue. Much attention is paid to the cultivation of grapes, small fruits, and vegetables.

Dairying is an important industry. The dairy cows exceed in number all other cattle. Horses, sheep, and swine are grown profitably, but none of these classes of animals is represented by large numbers. Cut-over timber land is utilized to a considerable extent for grazing.

Manufacturing. The State is noted as a manufacturing community. It has had a gradual increase during the last half century in the number of wage-earners. Excellent water power is afforded by the Merrimac and other streams, along which the larger manufacturing centers are located. The cotton mills stand at the head of the industrial establishments, employing about 1,500,000 spindles. Granite is converted extensively into building materials and monuments. Other manufactures include boots and shoes, hosiery, paper and wood pulp, flour, machinery, ironware, timber products, leather, and woolen goods. Many of the manufacturing industries are centered at Nashua, Manchester, and Portsmouth.

Transportation. Railway building received attention at an early date and nearly all parts of the State are provided with lines, though the northern section is not well equipped. Several trunk lines cross the State, including those of the Grand Trunk, the Boston and Maine, and the Maine Central railway companies. Electric railways are operated in the cities and adjacent territory. The steam railways aggregate a total of 1,300 miles. During the summer a railroad built up Mount Washington is operated. It is a little more than two miles long and makes an ascent of 3,625 feet. Foreign trade, though not large, is centered at Portsmouth.

Government. The constitution now in force was adopted in 1877. It vests the executive authority in the Governor and a council of five members, who are chosen by popular vote for two years. Other State officers include the treasurer, secretary of State, and commissary general, who are chosen by joint ballot in the Legislature. The legislative functions are discharged by a General Assembly, consisting of 24 senators, chosen by districts, and a house of representatives, whose members are apportioned among the towns and wards of cities according to population. Members in both houses of the Legislature are elected for terms of two years. A supreme court has appellate jurisdic-

tion and to it are subject the courts of record and other courts. All the judicial officers serve during good behavior, except justices of the peace, who are elected for five years. Local government is administered by counties, cities, and towns.

EDUCATION. Every child between the ages of eight and fourteen must by law be sent to school in the town or city in which he resides. The law bears upon the parent or guardian and not upon the child, the former being subject to penalty for failure to send the child to school. Entrance upon the public school is through the elementary department, whether rural or urban, graded or ungraded. The subjects taught vary considerably, but in general they may be said to embrace the recognized fundamentals of learning, with the addition in some instances of music, drawing, handwork, etc. A few of the more progressive and wealthy towns and cities supply good kindergartens prior to the elementary school. About 1,112 of the elementary schools are graded and 1,014 are ungraded. However, the graded schools are constantly increasing in number, with a corresponding decrease in the ungraded schools. After eight years, or in a few cases nine years, of attendance upon such elementary schools, the pupil is expected to pass an examination or give other proof of qualification to enter a high school or academy, called a *secondary school.*

The secondary school is an institution properly equipped for teaching such subjects as are required for admission to college, or equivalent subjects. It must be approved as being of college-preparatory standard by the State commissioner. The secondary school system is made up of city and village high schools, about 50, and an additional 20 endowed academies. Other institutions included with these schools are Brewster Free Academy, Wolfboro; Saint Paul's School, Concord; and Phillips Exeter Academy, Exeter, both of the latter being secondary institutions of international reputation. Normal schools of high grade are maintained at Keane and Plymouth. It has a course of two years and pupils are admitted only upon graduation from an approved secondary school.

The University of New Hampshire, which includes College of Agriculture and Mechanic Arts, is at Durham, and Dartmouth College is at Hanover. Every child in the State who is qualified is entitled to preparation for either of these institutions at public expense, and, once within the college, numerous free scholarships and other means of providing for the expense of collegiate education make it possible for every one of determined temper to win his way through college. The State university is coeducational. Saint Anselm's College (Roman Catholic) is located at Manchester. Laconia has a school for feeble-minded children, Concord has a hospital for the insane, and Franklin has an orphans' home. The industrial school is at Manchester and the State penitentiary is at Concord.

INHABITANTS. The density of population is about 46 to the square mile. A large number of emigrants have left the State to settle in the west central part of the Union, but this has been compensated for by the immigration of foreigners, especially Canadians, who constitute the larger part of those born in foreign lands. Nearly all the inhabitants are Protestants, including chiefly Congregationalists, Baptists, and Methodists. Concord, on the Merrimac River, is the capital. Other cities include Manchester, Nashua, Dover, Portsmouth, Keene, Rochester, Somersworth, Laconia, Claremont, Berlin, and Exeter. In 1900 the State had a population of 411,588. This included a total colored population of 797, including 112 Chinese and 662 Negroes. Population, 1920, 443,083.

HISTORY. The first settlements in New Hampshire were made in 1623 near Dover and Portsmouth, under a grant of land to Sir Ferdinando Gorges and John Mason, the grant covering the region between the Merrimac and the Kennebec rivers. In 1629 Mason obtained a separate grant for the territory between the Merrimac and the Piscataqua. From 1641 to 1679 the region formed a part of Massachusetts, to which it was joined again from 1689 until 1692 and again from 1699 to 1741. Colonial governors ruled during the intervening dates. A temporary government was formed in 1775, when it entered the American confederacy, and the present constitution was adopted in 1792. The State actively supported the Revolution and on June 21, 1788, ratified the national Constitution. Portsmouth was the capital of the colony and later it was removed several times, but Concord became the permanent capital in 1805. The Union was supported with much enthusiasm at the time of the Civil War, when the State furnished a large number of volunteers.

NEW HAVEN, a city of Connecticut, county seat of New Haven County, on Long Island Sound, 72 miles northeast of New York City. It is at the head of New Haven Bay, on many steamboat lines and on the New York, New Haven and Hartford Railroad, and ranks as the largest city of the State. The streets are regularly platted and many of them are finely paved with cement and asphalt. The site consists of a level plain of 24 square miles, bordered on the east by the Quinnipiac and on the west by the West River. Near the city are ranges of hills, from which two spurs known as East Rock and West Rock extend some distance, rising to heights of about 400 feet.

The city has many beautiful parks, including one in which East Rock is a prominent feature, on the summit of which is a monument erected to the memory of the soldiers and sailors. About 1,550 acres are included in the parks of the city, some of which overlook the harbor, and others are located at convenient points. In the heart

of the city is a public square known as The Green, which is bordered by stately elm trees, hence New Haven is popularly called the *City of Elms.* Many of the buildings are commodious and modern, while others are noted for their historic associations. An old burial ground on Grove Street contains the graves of Eli Whitney, James B. Dana, Timothy Dwight, Noah Webster, Theodore Winthrop, Samuel F. B. Morse, and Charles Goodyear.

New Haven is the seat of Yale University, one of the most celebrated institutions of higher learning in America. It has a public library of 54,500 volumes. The educational institutions include a State normal school, the Boardman Manual Training School, the Hopkins Grammar School, and the Hillhouse High School. It has many hospitals and civic and charitable institutions, and contains valuable collections in history and the sciences. Many of the public schools and churches are fine buildings, and the latter include structures erected at an early date. The public buildings are substantial structures, such as the county courthouse, the Federal building, and numerous business and office buildings.

New Haven is noted as a manufacturing center. It has a commodious harbor, hence carries a large coast and inland trade. The manufactures include firearms and ammunition, hardware, clothing, clocks and watches, needles, textile fabrics, musical instruments, and slaughtering and meat-packing products. Large railway repair shops are located within the city. It has a growing wholesale and jobbing trade. An extensive electric railway system affords communication with suburban and interurban points. A sewer system of 98 miles is maintained. The city has an efficient waterworks system, electric and gas lighting, and well-organized police and fire departments.

A company of Puritans settled on the site of New Haven in 1638, when the place was called Quinnipiac. The settlement flourished under the direction of John Davenport, a Puritan minister, and Theophilus Eaton, a wealthy merchant of London. In 1640 the name was changed to New Haven and at the same time it was made the capital of New Haven Colony, which was united with the New England Union in the same year. It was made a part of the Connecticut colony in 1662 and was jointly the capital of the State with Hartford from 1771 until 1873. The British captured the town in 1779. It was incorporated as a city in 1784, but its growth dates properly from 1848, when the first railway was completed. Fair Haven was annexed to the city in 1870. Population, 1920, 162,519.

NEW HEBRIDES (hĕb'rĭ-dēz), a chain of islands in the Pacific Ocean, located east of Australia and north of New Zealand. They embrace about thirty islands of volcanic origin, the entire group containing an area of about 5,000 square miles. Among the principal islands are Espiritu Santo, area 1,850 square miles; Mallicolo, 1,150 square miles; Ambrym, 500 square miles; Sandwich, 435 square miles; Tanna, 175 square miles; and Erromango, 650 square miles. The islands contain a number of active volcanoes, but possess much fertile soil and excellent timber. They produce sugar cane, yams, bananas, cocoanuts, and other varieties of tropical fruits. Horses, cattle, and sheep are reared in abundance. The Portuguese discovered these islands in 1606, but they were claimed by the British on the strength of explorations made by Captain Cook in 1773. The inhabitants are mostly Melanesians. A commission of French and English officers has general administration of the islands. Population, 1922, 72,456.

NEW IBERIA (ī-bē'rĭ-ā), a city of Louisiana, capital of Iberia Parish, twelve miles north of Vermilion Bay, an inlet from the Gulf of Mexico. It is 125 miles west of New Orleans, on the Southern Pacific Railroad, and is surrounded by a fertile farming country, producing cotton, cereals, fruits, and sugar cane. The chief buildings include a Federal post office, a city hall, a public market, and several schools and churches. Among the industries are sawmills, shipyards, machine shops, foundaries, and brickyards. The city has waterworks, electric lights, and sanitary sewerage. Avery's Island, located near the city, has large deposits of salt rock. In the vicinity are points of interest, some of which figure in Longfellow's "Evangeline." Population, 1900, 6,815; in 1920, 6,278.

NEW JERSEY (jĕr'zĭ), one of the original thirteen states of the United States, classed with the Middle Atlantic group, popularly called the *Jersey Blue State.* It is bounded on the north by New York, east by New York and the Atlantic Ocean, south by Delaware Bay, and west by Pennsylvania, from which it is separated by the Delaware River. The Hudson River and Staten Island Sound separate it from New York. Its seacoast on the Atlantic has a length of 120 miles. The length from north to south is 167 miles, the average width is 50 miles, and the area is 7,815 square miles, including 290 square miles of water surface.

Description. The State is included largely in the Atlantic coast plain, only its northwestern part being traversed by chains of the Appalachian Mountains. In the extreme northwest is the Kittatinny Range, which belongs to the Blue Mountains of Pennsylvania, reaching its highest point in High Knob, near the boundary of New York, which has an elevation of 1,800 feet. Through this range flows the Delaware River, forming the celebrated Delaware Water Gap. Somewhat farther south is a region known as the Highlands, which comprises a plateau about 1,350 feet above the sea. Still farther south is the Piedmont Plain, consisting of an undulating plain which extends from the Hackensack valley to the Palisades along the Hudson. In the southern part, lying south of a line drawn between Trenton and Raritan Bay, is a belted

coastal plain, most of which is about 100 feet above sea level, though rising in some places 400 feet above the sea.

The State is well watered and drained, but all of the western part belongs to the basin of the Delaware, which receives the inflow from many small streams. In the northeastern part are the Passaic and the Hackensack rivers, which discharge into Newark Bay. The Raritan flows into Raritan Bay, the Great Egg Harbor into Old Inlet, and the Maurice into Delaware Bay. Several mountain lakes are in the north, including Hopatcong and Greenwood, the latter being partly in New York. Among the noted natural scenery are the Palisades of the Hudson, the Delaware Water Gap, and the Falls of the Passaic River. Sandy Hook and Cape May are the principal projections into the Atlantic.

NEW JERSEY.

1, Trenton; 2, Jersey City; 3, Camden; 4, Paterson; 5, Atlantic City. Chief railroads shown by dotted lines.

The climate in general is healthful, but varies according to altitude and proximity to the sea. The difference in the mean annual temperature of the north and the south is about 8°, being 46° in the former and 54° in the latter. Excessive humidity is sometimes produced by a meeting of the land and sea breezes. The rainfall averages between 44 and 50 inches, being somewhat greater in the eastern portion than along the Delaware. Atlantic City, on the southeastern coast, has a rainfall of 49 inches and an average temperature of 52°.

Mining. The State has large deposits of clays, which are mined extensively for the manufacture of brick and pottery. In the highland belt is a productive iron ore field, but it is not worked as extensively now as it was before the iron regions of the Great Lakes were opened. Granite deposits of much value are found in the north, where this mineral is quarried extensively for monuments and building purposes. In the output of zinc the State takes second rank, being exceeded only by Missouri. Large fields containing rock valuable in the manufacture of Portland cement are worked, and in the output of this product New Jersey holds second rank among the states. Sand suitable for glass making is obtained in the southern part. Other minerals include slate, copper, limestone, and coal, the last mentioned showing a decided gain in the output the last decade.

Agriculture. Sixty per cent. of the land is included in farms, and much of the surface has been increased in productiveness by the use of fertilizers. Many of the farms are small, but they are worked with great care. Corn is raised in all parts of the State and is the principal cereal, but it is exceeded in acreage by the area utilized in growing hay and forage. Other crops include wheat, oats, rye, potatoes, and buckwheat. Many small tracts are devoted to gardening and small farming, especially in the cultivation of tomatoes and sweet potatoes. Apples and peaches are grown in large quantities, and the marsh lands along the coast yield a fine grade of cranberries. New York, Philadelphia, and Jersey City are markets for a large quantity of vegetables, such as cabbage, melons, and sweet corn.

Milk cows are more numerous than other classes of cattle, which is accounted for by the fact that the State produces a large output of milk and cheese, both of which are marketed to an advantage. Other domestic animals include swine, horses, sheep, mules, and poultry. However, the larger share of the total income from the animal industry is obtained from dairying.

Manufactures. As a manufacturing State New Jersey occupies a leading place. It holds second rank in the output of pottery and third in the manufacture of clay products. For silk and silk goods produced it has first rank, and likewise holds a high place for the production of cotton and woolen goods. In the manufacture of jewelry it ranks fourth, the chief center being in Newark. Other manufactures include iron and steel, petroleum products, cotton and woolen textiles, rubber and elastic goods, hose and rubber belting, pipe tobacco and cigars, boots and shoes, and slaughtering and packing-house products. The industries devoted to manufacturing are located chiefly in the northern part of the State.

Fisheries. The extensive and greatly indented coast line is well adapted to fishing. All but four counties of the State participate in this industry and about 17,500 persons engage in it. Oysters constitute the leading catch, and the output is either marketed fresh or is preserved by canning. Other catches include clams, shad, cod, and bluefish. Small menhaden are canned in large quantities.

Transportation and Commerce. The State is favored by being located on the Hudson and Delaware rivers and the Atlantic, hence is provided with extensive transportation facilities by water. Two important canals are maintained, including the Delaware-Raritan Canal, extending from the Delaware to Raritan Bay, and the Maurice Canal, connecting Jersey City with the Delaware River at Phillipsburg. Railroad lines penetrate all parts of the State, including several

of the great railways which connect New York City with Philadelphia, Chicago, and Saint Louis. The total lines aggregate 2,500 miles. Camden, Newark, and Jersey City are the principal railway centers. Electric lines are operated in many parts of the State.

The export trade is chiefly in fruits, vegetables, and various articles of manufacture. Large quantities of coal are imported from Pennsylvania for use in the industries. The State is a good market for raw cotton and silk, using large quantities in the textile industry. Jersey City, opposite New York City, is the terminal for a number of railways, though much of the passenger traffic is carried across the Hudson River by ferries and through several railroad and traffic tunnels under the river.

GOVERNMENT. The constitution now in force was ratified in 1844 and was subsequently amended at a special election. Executive power is vested in a Governor for three years, and this officer cannot be reëlected to succeed himself. Other State officers include the treasurer, comptroller, attorney-general, secretary of State, clerk in chancery, adjutant-general, commissioner of banking and insurance, clerk of the supreme court, and superintendent of public instruction. Meetings are held annually by the Legislature, which is composed of 21 senators, elected for three years, and not more than 60 representatives, elected for one year. The highest court is known as the court of errors and appeals and is composed of the chancellor, the justices of the supreme court, and six additional judges. The chancellor presides over a prerogative court and the supreme court, which is composed of a chief justice and eight associates, holds sessions in different parts of the State. Subject to these courts are the county courts of common pleas, the courts of oyer and determiner, an orphans' court, and the court of general quarter sessions of the peace. A distinction is still maintained between courts of law and courts of equity.

EDUCATION. The illiteracy is given at 5.1 per cent., but among native whites it is only .6 per cent. Public schools are under the supervision of the State superintendent and a board of education, consisting of sixteen members, both being appointed by the Governor and senate. School attendance is compulsory and supplies and textbooks are furnished free. The State has long supported a vigorous policy in regard to public instruction, which may be said to have been organized in 1661, when a school was established at Bergen. All parts of the State have a good grade of elementary schools, while the towns and cities maintain high schools, and the whole system is supplemented by a number of institutions of higher learning. Princeton University, at Princeton, founded in 1746, is one of the most efficient institutions in North America. Rutgers College, at Brunswick, has affiliated with it the State agricultural and scientific school. Five public normal schools are maintained, one at Trenton, which is the chief training school for teachers, the four others being at Montclair, Newark, Glassboro, and Paterson.

Among the leading institutions of higher learning, aside from those named above are the Stevens Institute of Technology, at Hoboken, the Seton Hall College, South Orange; the Bordentown Female College, Bordentown; the Saint Peter's College, Jersey City; the Blair Presbyterian Academy, Blairstown; the Drew Theological Seminary, Madison; and the Pennington Seminary, Pennington. Trenton has a school for the deaf, Kearny has a home for disabled soldiers, and Trenton and Morris Plains have hospitals for the insane. The State penitentiary is at Trenton, the reformatory is at Rahway, and industrial schools are located at Trenton and Jamesburg. Vineland has homes for feeble-minded women and children. A village for epileptics is located at Skillman. Formerly the convicts were employed under contract, but now they are required to work upon goods that are used by the State institutions.

INHABITANTS. The density of population is about 420 to the square mile. Fully 70 per cent. of the inhabitants reside in fifty cities with a population of over 4,000. About one-fourth of the people are of foreign birth, including chiefly Germans and Irish. Trenton, on the Delaware River, is the capital. Other cities include Newark, Jersey City, Paterson, Trenton, Camden, Hoboken, Elizabeth, Bayonne, New Brunswick, Atlantic City, Passaic, Bridgeton, Plainfield, Union, Perth Amboy, Orange, Millville, Phillipsburg, Long Branch, and Harrison. In 1900 the State had 1,883,669 inhabitants. This included a total colored population of 71,352, of which 1,393 were Chinese and 69,844 Negroes. Population, 1920, 3,155,374.

HISTORY. The first settlement made in New Jersey was at Bergen, in 1617, by the Dutch. A fort was built near the site of Camden by the English under Cornelius May in 1623, and settlements were founded about the same time by the Swedes. In 1655 the Dutch under Governor Stuyvesant erected Fort Nassau on the Delaware and compelled the Swedes to recognize their authority. The Duke of York received a grant of the region from Charles II., and he transferred the country between the Delaware and the Hudson to Lord Berkeley and Sir George Carteret. Soon after the region was divided by its proprietors into East and West Jersey, the boundary line running from Little Egg Harbor northwest to the Delaware, and in 1682 East Jersey was purchased by William Penn and his associates. In 1702 the two colonies became united in a royal colony. After 1738 it was under the direction of royal governors. Indian troubles were avoided by purchasing titles, but, when the Revolutionary War began, the colony became a principal seat of contention and battled strenuously for American inde-

pendence. It ratified the national Constitution on Dec. 18, 1787, and adopted its present constitution in 1844. The growth and prosperity have been almost without intermission.

NEWLANDS, Francis Griffith, public man, born at Natchez, Miss., Aug. 28, 1848. He studied at Yale College and the Columbian College Law School, and began a successful law practice at San Francisco, Cal. In 1886 he became a trustee of the estate of William Sharon, formerly United States Senator from Nevada, in which State he established his permanent home. He was elected to Congress in 1892, serving consecutively for ten years, and in 1903 was chosen as a Democrat to the United States Senate, and was reëlected in 1909 and in 1915. He exercised a wide influence in promoting irrigation, advocated the free coinage of silver, and served on a number of important committees. He died Dec. 24, 1917.

FRANCIS G. NEWLANDS.

NEW LONDON, a city in Connecticut, one of the county seats of New London County, on the Thames River, three miles off the coast of Long Island Sound and seventy miles northeast of New York City. It is on the Central Vermont and the New York, New Haven and Hartford railroads. The harbor is defended by forts Trumbull and Griswold and has direct communication by steamboat with New York. The noteworthy buildings include the public library, the city hall, the high school, and several fine churches. It has the Boulder Park on the Thames, the little schoolhouse in which Nathan Hale was a teacher, and the Old Town Mill, erected in 1646 and still in operation. Among the manufactures are hardware, cotton and woolen goods, crackers, sewing silk, ships, boilers, machinery, and utensils. The city has electric street railways, waterworks, pavements, and a system of sanitary sewerage. It is an important seat of trade in whale and seal products. The place was settled by John Winthrop in 1646, when it became known as Naumeag, but the name was changed to New London in 1658. General Arnold attacked the place with a British force in 1781 and burned the stores and wharves. Population, 1900, 17,548; in 1920, 25,688.

NEWMAN (nū'măn), **Francis William,** educator and author, born in London, England, June 27, 1805; died Oct. 4, 1897. He was a brother of Cardinal Newman, graduated at Oxford, and in 1826 became a fellow of Balliol College. In 1830 he went on missionary work to Mesopotamia. He became tutor of Bristol College in 1833, was made professor of classics at Manchester New College in 1840, and from 1846 to 1863 held a similar position at University College, London. Professor Newman obtained a reputation as a student of Semitic and African languages and ranked as a versatile linguist. His writings include "Politics of Aristotle," "History of the Hebrew Monarchy," "Christian Commonwealth," "Moral Influence of Law," "Life After Death," and "Early History of Cardinal Newman."

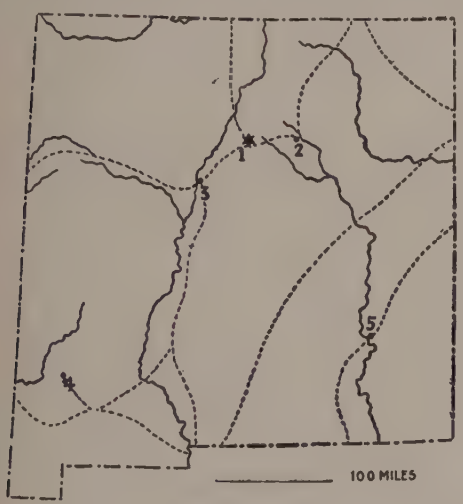
NEWMAN, John Henry, Cardinal, Catholic divine, born in London, England, Feb. 21, 1801; died near Birmingham, Aug. 11, 1890. He studied at Ealing and Trinity College, Oxford, graduated there in 1820, and the following year wrote a poem entitled "Saint Bartholomew's Eve." He was elected a fellow of Oriel College in 1822, where he formed an intimate friendship with Dr. Pusey and Hurrell Froude. His first work, entitled "The Arians of the Fourth Century," was published in 1832. It was written with the intention of demonstrating that the Arian heresy originated at Antioch as one of the Judaizing heresies. The same year Newman made a tour with Hurrell Froude to the Mediterranean, where he formed his ideas regarding clerical authority independent of the state, and in the meantime wrote a number of poems that afterward were published in a volume entitled "Lyra Apostolica."

Newman wrote his best known poem, "Lead, Kindly Light," while on his return voyage to England. At that time he became recognized as one of the foremost leaders among the ministers in England. He entered into the tractarian movement, which had begun in 1833, and many of the tracts that appeared were from his pen. In these tracts and public lectures he defined the distinctions between the Protestant and Roman Catholic faiths, and asserted that the Anglican Church holds a place immediately between the Church of Rome and popular Protestantism. In 1843 he withdrew from the Anglican Church and on Oct. 9, 1845, was received into the Roman Catholic Church. He spent the following year and a half in Rome. Cardinal Newman was the head of the English moderators, and in recognition of their aid Leo XIII. made him a cardinal on May 12, 1879. He possessed a rare intellect, effective power of speech, and liberal culture. Among his writings not mentioned above are "Loss and Gain," "Grammar of Assent," "Catholicism in England," "Development of Christian Doctrines," and "Dream of Gerontius."

NEW MEXICO (mĕks'ĭ-kō), a southwestern State of the United States, bounded on the north by Colorado, east by Oklahoma and Texas, south by Texas and Mexico, and west by Arizona. It is larger in size than any of the states, except Montana, California, and Texas. In form it is almost a perfect square, being broken only on the southern boundary. Measured along the western boundary from north to

south, it extends a distance of 400 miles, and the greatest width is 358 miles. It has an area of 122,580 square miles.

DESCRIPTION. Ranges of the Rocky Mountains traverse it from north to south, with various separated groups of hills and mountain ranges in different parts. The altitude in the northern part is from 5,000 to 7,000 feet and there is a gradual slope toward the south, where the altitude is from 3,000 to 4,000 feet above the sea. A considerable portion of the Staked Plains, or Llano Estacado, extends from Texas into the southeastern part, where the elevation above the sea is about 3,250 feet. The lowest land is in the Pecos valley, in the southeastern part, where the elevation is about 2,900 feet, but from that locality it rises toward the north and northwest. West of the Pecos valley is the



NEW MEXICO.

1, Santa Fé; 2, Las Vegas; 3, Albuquerque; 4, Silver City; 5, Roswell. Chief railroads shown by dotted lines.

Front Range, an elevated ridge of the Rocky Mountains, which has a number of peaks ranging over 12,000 feet high. The deep and narrow valley of the Rio Grande, west of the Front Range, extends across the entire Territory from north to south. Near the western boundary is the Continental Divide, which forms a broad plateau, dividing the tributaries of the Colorado from those of the Rio Grande.

The drainage is principally toward the south, the only exception being in the northeastern corner, where the drainage is carried by the Canadian River and its tributaries toward the east. In the southeastern part is the Pecos River, which receives the inflow from the Hondo and the Penasco, and discharges into the Rio Grande after entering Texas. The Rio Grande, entering from Colorado, flows through the central part, crossing the southern border to form the boundary between Texas and Mexico. Among its tributaries within New Mexico are the Chama, Jemes, and San José rivers. The southwest is drained by the Gila, the west central part by the head streams of the Little Colorado, and the northwest by the Rio San Juan. The streams rise largely from springs, but when the mountain snow melts in the summer season they become greatly enlarged.

The climate is pleasant and healthful, being remarkable for its pure air and clear sky. The mean temperature is about 49°, and the extremes range between 85° above and a few degrees below zero. In no part is the rainfall sufficient for the needs of agriculture, being only about 15 inches on the average. However, nutritious grasses are abundant in many places, while some sections of the plains are covered with sage brush. Fine forests of pine, spruce, and cedar abound in the mountains. Many of the valleys have timber of oak, sycamore, cottonwood, and dwarf cedar.

MINING. New Mexico has vast deposits of mineral wealth and presents a prolific field for profitable investment in mining. The coal area is extensive, the fields having rich veins both of bituminous and anthracite coal, and the quality is among the best obtained west of the Mississippi. The annual output is about 2,750,000 short tons. Gold and silver are mined extensively, the output of both showing a decided increase the past decade. Copper mining is an important enterprise, the annual output having doubled within the past ten years. Other minerals worked to a considerable extent include emerald, lead, zinc, iron, and gypsum. Valuable fire clays and fine building stones are abundant, but the output of these is not large.

AGRICULTURE. New Mexico has a large area of fertile soil, but agriculture is dependent upon irrigation. The region that may be improved for farming is necessarily limited, owing to a lack of large lakes and rivers. The principal irrigated districts are adjacent to the Rio Grande, San Juan, Pecos, Gila, and Canadian rivers. At present the irrigation ditches aggregate a length of 2,650 miles, and about 650,000 acres are accessible to the ditches. Hay and forage crops are cultivated on the largest acreage. Wheat of a fine quality is grown, especially in the Taos valley, and corn yields abundantly in the valleys. Other crops include oats, beans, fruits, and vegetables. It is noted for the production of fine varieties of pears, peaches, apples, plums, apricots, and grapes. The valley of the Rio Grande is noted for its fine quality of grapes.

New Mexico has a large area suitable for pasturage, hence vast interests are vested in the live-stock industry. It is exceeded in the number of sheep only by eight states, and the annual wool clip is placed at 10,500,000 pounds. Mesquite and other native grasses are most abundant in the eastern part, where the larger interests in ranching are centered. Cattle are grown chiefly for meat, though a considerable number of dairy

cows are reported. Other live stock includes horses, mules, and swine.

MANUFACTURES. The output of the factories has increased about 20 per cent. since 1920. Wool scouring is an extensive enterprise. Large interests are vested in the smelting and refining of ore and in railroad repair work. A number of flour and grist mills are operated and lumber milling is carried on where transportation is accessible. Other enterprises include cigar factories, machine shops, fruit canneries, and beet sugar factories.

TRANSPORTATION. Several trunk railway lines cross the State, and branches extend from them into various mining and agriculture sections. The Southern Pacific passes through the southern part, while the Atchison, Topeka and Santa Fé parallels the Rio Grande, and the Chicago, Rock Island and Pacific enters the eastern part. Pack animals and automobile lines are used for transportation to interior points. The total railway lines are placed at 3,125 miles. Large quantities of wool, cattle, sheep, coal, and metals are exported. The imports include clothing, machinery, and merchandise.

GOVERNMENT. New Mexico is governed under a constitution which was adopted in 1911 and amended at various times. Executive power is vested in the Governor, Lieutenant-Governor, Secretary of State, State Auditor, State Treasurer, Attorney-General, Superintendent of Public Instruction, and Commissioner of Public Lands. These officers are elected by general suffrage for terms of two years. Legislative authority is exercised by the Legislature, which consists of two branches, the Senate of 24 members elected for four years and the House of Representatives of 49 members elected for two years. Three Justices comprise the Supreme Court, elected for eight years. The State is divided into eight judicial districts, each having one judge elected for six years. Probate courts are maintained in all the counties. It is represented in Congress by two Senators and three Representatives. The government of the municipalities is entirely in the hands of local authorities, subject only to the laws of the State.

EDUCATION. The public school system is in a large measure patterned after the systems in the States of the middle west. A board of education, of which the Governor is ex-officio president, has entire charge of the general educational policy and the direction of higher and vocational training. The State superintendent of public instruction has supervision over all public schools, acting through the county superintendents, who are elected every two years by popular vote. City school systems are in a measure independent and under the direct supervision of city superintendents. The educational institutions include the University of New Mexico, Albuquerque; the Normal University, East Las Vegas; the State Teachers' College, Silver City; the New Mexico College of Agriculture, Las Cruces; the New Mexico School of Mines, Socorro; the New Mexico Military Institute, Roswell; the New Mexico Institute for the Blind, Alamogordo; and the New Mexico Institute for the Deaf and Dumb, Santa Fé. Illiteracy is placed at 20.2 per cent., but there is a general compulsory school attendance law, which is having the effect of placing educational work on a more satisfactory basis. Indian education is provide for in a number of schools by the United States government.

INHABITANTS. A large per cent. of the inhabitants are of Spanish descent and speak the Spanish language. Roman Catholic is the religion of a majority of the people, but the leading Protestant denominations are well represented. Santa Fé, in the north central part, is the capital. The principal cities include Albuquerque, Las Vegas, Socorro, Raton, Roswell, and Silver City. In 1900 the population was 195,314. This number included 15,103 colored inhabitants, of which 1,610 were Negroes and 13,144 Indians. Population, 1920, 360,247.

HISTORY. The region now included in New Mexico is among the sections which were explored at an early date by white men, being visited by the Spaniard Cabeça de Vaca in 1536. It was explored in 1581, when it was named New Mexico from its mineral wealth. Santa Fé was founded about 1609 and is one of the oldest cities in the United States. The Pueblo Indians carried on a protracted warfare against the Spaniards. When Mexico secured independence, in 1822, it was included in that country. General Kearny captured Santa Fé in 1846. New Mexico, by the treaty of Guadalupe Hidalgo, became a possession of the United States, being ceded in 1848. It was organized as a Territory on Sept. 9, 1850, when it included Arizona and a part of California and Colorado, and in 1853 a portion of the Gadsden Purchase was annexed. The present boundaries were established in 1866. With the beginning of railroad construction, in 1878, it began to develop rapidly. It was admitted as a State in 1912.

NEW MEXICO, University of, a coeducational institution at Albuquerque, New Mexico, incorporated under an act of the Legislature in 1889. It was opened for instruction in 1892, when it contained the normal, preparatory, and collegiate departments, and later were added schools of art, music, science, and commerce. With it is affiliated the Hadley Climatological Laboratory. It is endowed by a grant of land and has a library containing about 48,500 volumes. The attendance is 886 students.

NEW ORLEANS (ôr'lĕ-ạnz), an important city of the United States, the largest in the State of Louisiana, on the Mississippi River, 105 miles from its mouth. It is popularly called *Crescent City* from the older portion that extends round the curve of the river, being in the form of a crescent. The corporate limits inclose an area of 196 square miles, including all of Orleans and a portion of Jefferson and St. Bernard parishes.

The portions covered by solidly built districts have an area of 50 square miles. The city includes the town of Algiers, or Fifth District, located on the right bank, across from the principal part of the city. The site is on a level with the normal water lines in the Mississippi, and is protected from overflow during high water by levees which are from 12 to 20 feet in height. The river which is half a mile wide and from 50 to 200 feet deep, furnishes a frontage of 41 miles. An additional frontage of 11 miles is furnished by the Inner Harbor Canal.

DESCRIPTION. The streets are broad in the newer portion, which is separated by Canal Street, 200 feet broad, from the French Quarter, where many of the streets are narrow and irregular. Canal Street is the principal business thoroughfare, extending from the river entirely through the city and containing the larger business houses and principal electric railway connections. Esplanade Avenue, the finest street in the French Quarter, contains the residences of many French and Creole families. Other noteworthy streets are Prytania Street, Saint Charles Avenue, and Claborne and Rampart streets. Fine avenues of trees beautify the streets and avenues in the residential sections, including the fig, palm, live oak, palmetto, and magnolia. The odor of roses and sweet olive may be noted in the atmosphere even in winter, and on every hand may be seen such growths as the banana and live oak. The streets have an extent of 800 miles, but not more than half are improved by paving. However, the street railways are well systematized, extending to all parts of the city and many suburban points, such as West End and Chalmette, the site of the Battle of New Orleans. Until recently the sewerage was carried chiefly in gutters on both sides of the streets, but an extensive system of sewerage was installed in 1907. Well-organized police and fire departments, waterworks, gas and electric lighting, and other public utilities are maintained.

BUILDINGS. The post office and customhouse was erected at a cost of $5,000,000 and is built of massive granite. In the Cabildo, formerly the supreme court building, was made the transfer of Louisiana from France to the United States in 1803. The principal hotels include the Saint Charles, the Roosevelt, the De Soto, and the Monteleone. The city hall is modeled after a Greek temple and the new courthouse is constructed on a modern plan. Other buildings of note include the Sugar Exchange, the Masonic Temple, the Cotton Exchange, the Y. M. C. A. building, the Hennen building, the Board of Trade, the Association of Commerce building, the Howard Memorial Library, the Athenaeum building, the Jerusalem Temple, and the Union Indemnity building. A new library building, the gift of Andrew Carnegie, was erected in 1907. The city has many fine ecclesiastical buildings, including the Cathedral of Saint Louis (Catholic), the Christ Church Cathedral (Episcopal), the First Methodist, the Touro Synagogue, the Coliseum Place Church (Baptist), the First Presbyterian, the Church of the Immaculate Conception, and the Temple Sinai (Jewish). New Orleans has seven miles of public wharves, much of which are covered and equipped with derricks, locomotive cranes, and conveyors.

INSTITUTIONS. The city has a number of fine libraries, including the State library, the city public library, the Howard Memorial Library, and the Tilton Memorial Library of Tulane University. Of these fine collections of books and pamphlets the city library with 215,000 volumes is considered the more important, and the collections as a whole are surpassed by those of few cities in the Union. New Orleans is the seat of Tulane University, with which is affiliated the Sophie Newcomb Memorial College for women, one of the prominent institutions of higher learning. Several institutions are maintained for the education of Negroes, including the New Orleans University, the Leland University, the Straight University, and an institution for boys. The College of the Immaculate Conception was established by the Jesuits in 1847. Other educational institutions include Spencer's Business College, the Loyola University, the Newcomb College, and the Soule Commercial and Literary Institute. Many handsome buildings are maintained in the system of public schools. It has a large number of charitable institutions, such as the Charity Hospital, one of the largest of the kind maintained by cities in the United States. Many charities are supported by religious societies. Leading civic orders and educational associations are represented by a large membership.

INDUSTRY AND COMMERCE. New Orleans is the focus of ten great railway lines, including the Southern Pacific, the Queen and Crescent, the Southern, the Illinois Central, the Texas and Pacific, the Louisville and Nashville, and other railroads. It has facilities by the Mississippi River, which admits of entrance of the largest seagoing vessels, and steamers ply regularly between its port and many trade centers of the West Indies, Central America, and the Atlantic coast of America and Europe. A direct line is maintained by way of the Suez Canal to ports in Japan. It has a large foreign trade in the exportation of cotton, grain, live stock, lumber, and manufactured products. The imports include cordage, sugar, tobacco, and raw materials used in manufacturing.

As a center of manufacturing it possesses a number of advantages, such as proximity to raw materials and extensive avenues of communication. Rice cleaning and sugar refining are important enterprises, representing large institutions and extensive investments. It is a center for the manufacture of clothing, furniture, cigars and pipe tobacco, boots and shoes, and cotton-seed oil. As a wholesaling and jobbing center it takes unusual prestige, supplying a large scope of country inland with merchandise,

fruits, and supplies for local trade. As an export city it takes second rank in the United States, being exceeded in the volume transported only by New York City.

Parks and Cemeteries. The parks have an area of 1,700 acres. Between the city and Lake Pontchartrain, on Metairie Road, is the City Park. It occupies the site of a former plantation, containing 1,405 acres, and is beautified with many semitropical plants. Audubon Park, in the vicinity of Tulane University, consists of 350 acres. It contains a fine aquarium, much development in floral culture, several artificial lakes, and fine groves of magnolia, live oak, and other trees. Jackson Square, in the heart of the city, has an equestrian statue of General Jackson, and in its vicinity is the French market. At Chalmette, the site of the Battle of New Orleans, is a national cemetery and on the battlefield is a fine monument.

The cemeteries of New Orleans are visited by tourists at all seasons of the year. Owing to water being near the surface of the ground, it formerly was impossible to bury in excavations, and the bodies were placed in vaults rising in tiers from 6 to 12 feet. In many of the vaults are two apartments, the one above being a receptacle for the corpse, which, in due course of time, decays, when the bones remaining may be removed to the apartment below. The vaults are mostly constructed of fine Georgia marble or granite, and are hermetically sealed after receiving the corpses. These structures, interspersed with fine ornamentations and monuments, present a scene most beautiful. Metairie Cemetery, the handsomest in the city, contains the tomb of the Army of Tennessee, above which is an equestrian statue of Albert Sidney Johnston. Other cemeteries of note include Saint Louis No. 1 and Saint Roch's Campo Santo. Drainage has made tombs unnecessary.

History. New Orleans was platted in 1718 by Jean Baptiste Le Moyne and named in honor of the Duke of Orleans, who was at that time regent of France. It was made the capital of the French territory on the lower Mississippi in 1722, when the town consisted of only a few wooden buildings. Spain acquired the whole of Louisiana in 1762, but the people of New Orleans forcibly expelled the governor sent over from Spain in 1766. Those who took part in the revolt were punished by Alexander O'Reilly, then governor of Louisiana. The Treaty of Ildefonso, in 1800, ceded the territory to France, and in 1803 it became a part of the United States by virtue of the Louisiana Purchase. The city was incorporated in 1805 and subsequently had a long period of rapid growth, owing to its location on the Mississippi.

General Pakenham attempted to capture New Orleans for the British in the War of 1812, but he was defeated by General Jackson at Chalmette in 1815. It became an important commercial and military seat of the Confederacy in 1860, but in 1862 Commodore Farragut captured it for the Federals, and it was soon after occupied by General Butler as military governor. During the remainder of the Civil War it was important as a base of supplies for the Union army in the South, and after the close of the war it suffered from misgovernment a number of years. Federal troops were stationed in the city until 1877, at which time the *carpetbag rule* ended and free government was restored. The capital of the State was removed to Baton Rouge in 1880. In 1884 it was the seat of the Cotton Centennial Exposition. At present it ranks as the twelfth city of the United States. Population, 1900, 287,104; in 1920, 387,408.

NEW ORLEANS, Battle of, the last engagement of the War of 1812, fought at Chalmette, near New Orleans, La., Jan. 8, 1815. The city was defended by General Jackson with 5,000 men. In December, 1814, General Packenham and 7,000 British troops came from Jamaica with the view of capturing the city and thus obtaining control of the territory adjacent to the Mississippi. The Americans had built extensive breastworks of earth, timbers, and cotton bales, and were attacked by the British on Jan. 8, 1815, who were repulsed with a loss of 2,500 men, including many officers and General Packenham. The Americans lost only eight killed and thirteen wounded. The battle was fought after the Treaty of Ghent had been agreed upon, but this fact was not known to the commanders. This battle stimulated a feeling of nationality in America, and was one of the causes that won general popularity and the Presidency for General Jackson. It is frequently called the Battle of Chalmette.

NEW PHILADELPHIA, a city in Ohio, county seat of Tuscarawas County, on the Tuscarawas River, 98 miles south of Cleveland. It is on the Pennsylvania and the Baltimore and Ohio railroads. The surrounding country is fertile and contains extensive deposits of coal, salt, and iron ore. Among the chief buildings are the county courthouse, the public library, and the high school. It has manufactures of tin plate, machinery, brick, flour, agricultural implements, hardware, nails, cast iron pipes, and earthenware. Waterworks, sanitary sewerage, and Tuscora Park are noteworthy features. It was settled in 1805 and incorporated in 1808. Population, 1900, 6,213; in 1920, 10,718.

NEWPORT, a city of Kentucky, in Campbell County, at the junction of the Licking and Ohio rivers, opposite Cincinnati, with which it is connected by an extensive iron bridge. Communication is by the Chesapeake and Ohio and the Louisville and Nashville railroads. It is handsomely located on a fine site, has good municipal facilities, and is a favorite residence of many Cincinnati business men. The manufactures include watch cases, hardware, stoves, machinery, engines, textiles, and earthenware.

Among the features are the post office, the junior and high schools, the Masonic Temple, the United States Military Post at Fort Thomas, and the public library. It has brick and asphalt pavements, a sanitary sewer system, and electric street railways. The place was settled in 1791 and was chartered as a city in 1850. Population, 1900, 28,301; in 1920, 29,317.

NEWPORT, a city of Rhode Island, in Newport County, on Narragansett Bay, about thirty miles south of Providence. It is on Rhode Island and on the New York, New Haven and Hartford Railroad. The surrounding country is agricultural, yielding cereals and fruits. Forts Adams and Geble are at the entrance to the harbor. The noteworthy buildings include the city hall, the Sayer House, the Trinity Church, and the Vernon House, built in the 18th century. It contains some of the finest summer residences in the world, which have given it a reputation as one of the most popular summer resorts of America. Near it, on Coaster Harbor Island, is the United States Naval War College, and in connection with it is a naval training school and torpedo station. The city has excellent schools, finely improved streets, beautiful parks, and several large libraries, notably the Red Wood Library, founded in 1747. It has a considerable trade and manufactures of textiles, metal goods, clothing, webs, and utensils. Paved streets, waterworks, and electric street railways are among the improvements. Newport was settled in 1639 and had the first public school in America. It was incorporated in 1784. Population, 1900, 22,441; in 1925, 27,757.

NEWPORT, a port city of England, in Monmouthshire, on the Usk River, about four miles from Bristol Channel and twelve miles northeast of Cardiff. It is situated in a picturesque region, having hills almost surrounding it, and contains manufactures of machinery, anchors, chain cables, sails, and earthenware. The docks and wharves are extensive. It is the seat of the Saint Woolos Church and contains the old castle built in 1130 by Robert, Earl of Gloucester. Population, 1921, 83,700.

NEWPORT NEWS, a city in Virginia, county seat of Warwick County, fourteen miles west of north of Norfolk, near the mouth of the James River. Communication is furnished by the Chesapeake and Ohio Railroad, of which it is the terminus. It is a port of entry and has a fine harbor. The features include Casino Park, the public library, the county courthouse, and a summer resort on the James River. It has extensive wharves and large elevators and it has connection with neighboring cities by an electric railway. The city has modern municipal facilities, including pavements, electric lights, and waterworks. Peanuts are produced extensively in the surrounding country. It is one of the four largest grain shipping ports of the United States. Population, 1900, 19,635; in 1920, 35,596.

NEW RED SANDSTONE, a geologic formation belonging partly to the Carboniferous and partly to the Triassic formations. It is so-called to distinguish it from the Old Red Sandstone group, which is similar in construction, but lies below the coal measures. It consists chiefly of shales, loams, and sandstones and in color is reddish. The name is used chiefly in Great Britain, while in America the formations of this kind are usually called Newark System.

NEW ROCHELLE (rō-shĕl'), a city of New York, in Westchester County, sixteen miles from New York City, on Long Island Sound. It is on the New York, New Haven and Hartford Railroad and is noted as a popular summer resort. New Rochelle is the residence of many New York business men. The features are a monument of Thomas Paine, the high school, the College of New Rochelle, and many large business establishments. Among the manufactures are scales, cigars, utensils, and earthenware. It was founded by Huguenots from France in 1687 and was so named from La Rochelle. Population, 1905, 20,480; in 1925, 44,222.

NEW SIBERIA (sī-bē'rĭ-à), or **Liakhov,** the name of a group of islands in the Arctic Ocean, north of Eastern Siberia, with an area of 9,575 square miles. The principal islands are Kotelnoi, Liakhov, and New Siberia. These islands are uninhabitable on account of severe cold. They contain neither bushes nor trees, but are visited by hunters and for many fossils deposited in the soil, including bones and teeth of buffaloes, mammoths, and rhinoceroses.

NEW SOUTH WALES, a State in the southeastern part of Australia, bounded on the north by Queensland, east by the Pacific Ocean, south by Victoria, and west by South Australia. A part of the southern boundary is formed by the Murray River and part of the northern by the parallel 29° south latitude. The area is 310,367 square miles, or more than five times greater than that of England and Wales.

Description. The surface is diversified by ranges and groups of mountains, which are classed with the highlands known as the Great Dividing Range. In the south it is known as the Australian Alps, in the center as the Blue Mountains, and in the north as the New England Range. As a whole, these highlands are rugged and broken by deep ravines. Near the southern boundary is Mount Kosciusko, height 7,308 feet, the highest ummit. West of the highlands is a gently rolling plateau, which declines toward the west, but gradually rises from the Darling River toward the northwest, where the Stanley and Grey ranges have an altitude of 2,000 feet. Along the eastern coast is a narrow and fertile plain, characterized in various places by headlands extending into the Pacific.

The drainage is chiefly toward the west and southwest, but a number of small rivers flow from the highlands toward the east into the Pacific. The latter include the Hawkesbury, which has a general course toward the northeast.

flowing into the Pacific a short distance north of Sidney. Practically all of the drainage east of the Great Dividing Range is by the Murray and its tributaries, which include the Darling and the Murrumbidgee. The Culgoa and Bogan flow into the Darling and the Lachlan is a confluence of the Murrumbidgee. Many of the streams sink away in the sand or become dry during dry season, but during the periods of rain they assume large proportions, frequently covering extensive tracts of land.

The climate is pleasant and healthful, but in the north it is subtropical. In the coast region the mean temperature is 76° and the maximum for January seldom exceeds 102°, but in the interior it frequently registers 130°. Hot dust winds frequently blow during the dry season to which the interior is subject. The heaviest rainfall is in the vicinity of Bombala, in the southeast, where it averages seventy inches, while the coast farther north has a precipitation of fifty inches. In the interior the rainfall ranges from eighteen to twenty inches, but in the northwest it seldom exceeds ten inches. Scant vegetation, including stunted shrubs, is found in the arid plain, but the eastern part has fine forests of eucalyptus and other trees.

Mining. The geological formations on the east side of the Great Dividing Range belong mostly to the sandstone of the carboniferous system and contain extensive deposits of coal. The western slopes are formed largely of granite, basalt, and volcanic trap. It is estimated that the coal fields cover an area of 25,000 square miles and the yearly output shows a constant increase since 1905. Gold has been mined from an early date in the history of Australia, but the output is at present exceeded in value by silver and coal. Iron ore is mined extensively and copper and lead are obt ined in considerable quantities. Other minerals include zinc, tin, graphite, mercury, bismuth, and diamonds. Petroleum is obtained in the Blue Mountains and clays valuable for brick and pottery are abundant.

Agriculture. Many products can be grown profitably on the coast, where rainfall is ample and the climatic conditions are favorable to farming. Fruit culture is especially profitable, the yield including oranges, grapes, and bananas. Corn is grown on the largest acreage, but it is followed closely by the cultivation of grasses suitable for hay. Other crops include oats, barley, sugar cane, and vegetables. The mulberry tree and silk culture have been introduced successfully. Though the climate is favorable in practically all parts, large areas have insufficient rainfall for the growing of cereals, hence stock raising takes rank in those sections as the leading industry.

Although plants suitable to an arid climate have been introduced, the larger part of the State is utilized for grazing. In some seasons the water supply is insufficient, hence the flocks of sheep are reduced to a considerable extent during the droughts. The number of sheep is given at 58,500,000. Most of the sheep are kept on State land which is leased to stockmen. Cattle are grown chiefly for meat, though dairying is an important enterprise in the older settlements of the east. Other stock includes swine and horses.

Manufactures and Commerce. The manufacturing enterprises are centered largely at Sydney and in its vicinity. Most of the manufactures consist of clothing, machinery, and foodstuffs. Considerable lumber products, earthenware, leather, ironware, soap, and spirituous liquors are produced. Sugar is manufactured from native-grown sugar cane and considerable wine is made for export from home-grown grapes.

A large domestic and foreign trade is carried on, but it is confined chiefly to Newcastle, Broken Hill, and Sydney. Wool is the chief article of export and it is followed in order by silver, coal, copper, gold, tallow, hides, and fruits. The imports consist chiefly of manufactured products, such as chemicals, textiles, and machinery. England, the United States, Germany, and France have the larger share of the trade. The State has 4,500 miles of railways, about twice that extent of improved government roads, and a large mileage of telegraph and telephone lines.

Government. The executive power is vested in a Governor, appointed by the crown, and in the administration he is assisted by a responsible ministry. The legislative functions are exercised by a Parliament of two branches, known as the legislative council and the legislative assembly. In the former are 56 members, appointed for life by the Governor, and in the latter are 90 members, chosen for terms of three years by universal sufferage without regard of sex. The State is represented by six senators and by 26 representatives in the Parliament of the Commonwealth of Australia.

Attendance upon public schools is obligatory between the ages of six and fourteen years, and the schools are maintained under a system of public taxation. The University of Sydney, founded in 1852, is at the head of the educational system and is maintained by the State. Charitable, reformatory, and correctional institutions are organized under the laws of the State. Ample provisions have been made for special education in law, medicine, mining, agriculture, dairying, and military science.

Inhabitants. New South Wales has grown rapidly in population since 1860 and at present is the most populous State in the Commonwealth. Nearly half of the people are Anglicans, about one-fourth are Catholics, and the remainder are largely Presbyterians, Methodists, and Lutherans. Sydney, on the Pacific coast, is the capital and largest city. It takes rank as the tenth commercial port of the world. Other cities of importance include Newcastle, Broken Hill,

Fitzroy, Paddington, Parramatta, Goulburn, Bathurst, Albury, Maitland, and Wickham. In 1921 the population was 2,199,763. This included 2,012 natives and 9,355 Chinese.

History. New South Wales is the oldest colony in Australia. The region was visited by Cook in 1770 and a penal settlement was established at Botany Bay in 1788. Convict immigration led to some degree of development, many persons being sent from England on the slightest pretext, and a large number of them became highly prosperous. The colonial charter was granted in 1839, when the lands were thrown open for settlement under favorable conditions, and several educational institutions were founded by the government in 1843. Victoria was made a separate colony in 1850 and in 1851 gold was discovered, which caused an immense immigration from many parts of Europe and Asia. A railway line was opened for traffic between Sydney and Parramatta in 1855, and this was soon followed by the construction of many interior and branch lines, thus leading to the rapid and prosperous development which it has enjoyed since. Queensland was made a separate colony in 1859. It remained a colony until 1901, when it became an influential State in the Commonwealth of Australia.

NEWSPAPER, a printed publication issued in periodical intervals for general circulation, containing news, editorials, and advertisements. This class of publications is not only of comparatively recent origin, but has undergone vast improvements as a result of improved machinery and the enlarging of the means to communicate among cities and countries. The extension of education and growth in public intelligence is making more popular all classes of publications designed to furnish information relating to current events, as well as magazines devoted to literature and scientific advancement. In fact, the growth in sentiment favorable to more general reading is noticeable in all countries where civilization and society make any pretense of progressive development.

The newspapers and other periodicals published in the United States exceed numerically like publications of any country in the world. It is estimated that the number of newspapers issued in the world in 1926 was 80,500, an increase of about ten per cent. during the previous five years. In most countries of Europe and America there is a noticeable tendency for the press to become less personal and more independent from time to time, although nearly all newspapers may be classed with some political party. However, the discussion of public questions is characterized by a calmness and moderation quite rare a half century ago. The growth of the business of issuing a great paper daily has been such that the editor in chief does not represent personally as large an influence as was the case formerly. News agencies are maintained in America and Europe, and hundreds of correspondents are employed by the great dailies to cable news from all parts of the earth.

The division of labor affects a great paper as much as any economical enterprise, the work being divided and subdivided. *Reporters* gather news under the direction of a *city editor,* while correspondence and telephone and telegraphic news are edited by a *news editor,* and *copying editors* sift and classify reports from the press association. Other periodicals are read by an *exchange editor,* who gleans for publication what he regards of general interest, and *editorial writers* prepare comments on the news of the day. Most papers have a department for women readers and employ editors for commerce, finance, sport, and market news. Critics to review current literature, music, and the theater are at work constantly. Special editions are issued on Sunday. The editions which are published late in the afternoon and in the evening are revised more or less, and some of the larger dailies employ a *night editor.*

Below is an estimate of the newspapers published in the leading countries of the world: United States, 20,800; Germany, 12,500; France, 6,600; Great Britain and Ireland, 6,500; Austria-Hungary, 5,950; Japan, 3,100; Italy, 2,800; Canada, 1,460; Spain, 855; Russia, 830; Australia, 825; Greece, 610; Switzerland, 480; Holland, 350, and Belgium, 330. New York has a larger number of newspapers than any State, the number being 2,130. Next in order are Illinois, 1,762; Pennsylvania, 1,180; Ohio, 931; California, 907, and Missouri, 842. The largest number of periodicals issued in any Province of Canada is published in Ontario; but all the provinces have representative newspapers and magazines.

It is thought that bulletins were sent from Rome, known as *acta diurna,* several centuries before the Christian era, for the purpose of giving accounts of the progress being made by the imperial army. They constituted the first enterprise similar to newspapers and journals published at present. These journals passed directly to the generals, who caused them to be communicated to the entire army. They not only contained an outline of the government policy, but also conveyed information in relation to punishment, deaths, sacrifices, and other matters of general interest. The Pekin *Gazette,* published in China, was founded about 1350 A. D. and is the oldest daily newspaper now issued regularly. It is certain that the first printed newspaper in the world appeared in Germany in the latter part of the 15th century, the earliest publication being the *Neue Zeitung* at Augsburg. See **Journalism.**

NEWT (nūt), or **Eft,** the common name applied to various classes of amphibians which closely resemble the salamanders. The form is more slender than that of salamanders, their habits are more active, and they are oviparous. The different species are strictly air breathers. They are aquatic in habits, and, though the lar-

val gills fall off when the animal is about three months old, they retain the larval tail. In all species the skin is soft and has warty lumps. The tail is elongated and flattened while in the water, but becomes somewhat rounded when the animal frequents the land. Newts vary in length from three to seven inches, and the male of most species is distinguished by a fleshy ridge or crest on the back. They are widely distributed and are regarded as the most obnoxious animals in appearance, but they are not in any sense venomous. Their food consists of in-

SMOOTH NEWT. COMMON NEWT.

sects' larvae, snails, worms, and frog spawn. The limbs are weak, which gives them an awkward appearance when crawling on the land, but in the water they move with considerable ease by paddling with the tail. Various parts, such as the legs and tail, are reproduced when lost by accident, as is the case with many animals allied to them. They are often mistaken for lizards, but differ widely from them in many important characteristics.

NEWTON, a city in Iowa, county seat of Jasper County, 35 miles east by north of Des Moines, on the Minneapolis and St. Louis and the Chicago, Rock Island and Pacific railroads. It is on several surfaced highways and is surrounded by a fertile farming country. The features include the courthouse, the Carnegie Library, the post office, and the junior and high schools. It is noted as the largest producer of washing machines in the world and has manufactures of brick, tile, and machinery. The trade in produce and merchandise is growing rapidly. Population, 1925, 7,665.

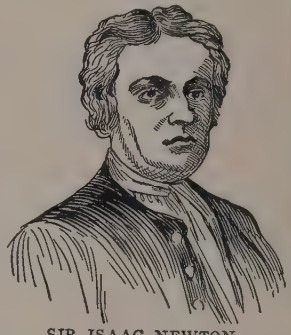
NEWTON, a city in Kansas, county seat of Harvey County, on Sandy Creek, 135 miles southwest of Topeka. It is on the Missouri Pacific and the Atchison, Topeka and Santa Fé railroads. It has a public library, the Bethel College, and several school and county buildings. Among the manufactures are flour, utensils, dairy products, soap, candy, machinery, and ironware. The place was settled in 1871 and incorporated the same year. Population, 1925, 9,831.

NEWTON, a city of Massachusetts, in Middlesex County, on the Charles River, seven miles west of Boston. It is on the Boston and Albany Railroad and has communication by an extensive system of electric railways. The site includes thirty square miles and is beautified by several hills and many fine streets.

Newton has a large commercial trade and is an industrial center. It has manufactures of ink, hosiery, paper, soap, dyestuffs, machinery, chemicals, cordage, India-rubber goods, and vehicles. The site was first settled in 1630 and the city became incorporated in 1873. It is a favorite residence of many Boston merchants, and is often called "The Garden City" of New England. Fifteen villages are included within its limits. Population, 1925, 53,003.

NEWTON, Hubert Anson, astronomer, born in Sherburne, N. Y., March 19, 1830; died in New Haven, Conn., Aug. 12, 1896. He completed a course at Yale in 1850, where he later made a special study of mathematics, and in 1853 took charge of the department of mathematics, of which branch he became full professor in 1855. Newton took high rank as a mathematician, made discoveries in astronomy that led to a successful computation of the orbit of the comet of 1866, and was influential in causing the metric system of weights and measures to be published in educational text-books. A decree was granted to him by the University of Michigan in 1868, and he was otherwise honored by many American and foreign scientific societies. In 1885 he became president of the American Association for the Advancement of Science, was director in chief of the Yale Observatory, and for many years had editorial connection with the *American Journal of Science.*

NEWTON, Sir Isaac, philosopher and mathematician, born at Woolsthorpe, England, Dec. 25, 1642; died March 20, 1727. He attended a village school, afterward studied at a grammar school in Grantham, and in 1660 entered Cambridge University, where he graduated in 1665, receiving the degree of bachelor of arts. In 1666 he was chosen a fellow of Trinity College, Cambridge, and in 1668 received the degree of master of arts. He became professor of mathematics at Trinity College in 1669, three years later was made a member of the Royal Society, and in 1689 entered Parliament as one of the representatives of the university. He retained his seat only a year, and, while not taking part in any of the debates, he was a studious and active member. In 1696 he became warden of the mint and in 1699 was appointed to the office of master of the mint,



SIR ISAAC NEWTON.

a position he held until his death. The university again selected him as a representative to Parliament in 1701 and for some time most of his efforts were in the line of public duty, but his intervals were devoted studiously to the study of many scientific problems.

Newton was chosen president of the Royal Society in 1703, which position he held until his death, a period of 25 years, being reëlected each year. Queen Anne knighted him in 1703 and he was honored by many celebrated societies of Europe. He is distinguished more on account of his service to astronomy and philosophy than for his public activity, his philosophical investigations dating from his early school life. From Voltaire we have the anecdote that Newton secured his first idea of universal gravitation, in 1666, from observing the fall of an apple from a tree. This tree was preserved until 1820, when it was cut down, owing to decay, but it is still treasured as a relic. The fall of the apple induced him to investigate systematically the force that holds the planets and satellites in their orbits. Accordingly he used the earth's radius as a measure, but was at first unsuccessful because of the erroneous estimate that prevailed in regard to the earth's diameter. However, he afterward reduced the estimate of the earth's diameter to more accurate figures, being guided in this by Picard's measurement, and thereby successfully demonstrated that all bodies of our solar system are held in their orbits by gravitation.

Newton completed his researches of gravitation in 1684 and in 1687 published his celebrated work in relation to that phenomenon, entitled "Philosophiae Naturalis Principia Mathematica." He investigated the phenomenon of light and published a valuable treatise in regard to its decomposition. He believed in what is known as the *corpuscular theory*, according to which light consists of minute particles of matter radiated in straight lines from a luminous object, the ray being endued with alternate fits of easy reflection and easy transmission. Newton demonstrated the practicabiltiy of using two lenses in telescopes, engaged extensively in mathematical analysis, especially the binomial theorem of numbers, and wrote a number of treatises on theological subjects. His greatest work is the one mentioned above, which is commonly known as Newton's "Principia." Other works of importance include "Treatise on Optics," "Universal Arithmetic," "Analytical Geometry," "History of the Creation," "Church History," "Observation of the Prophecies of Daniel," "Apocalypse of Saint John," and "Historical Account of Two Notable Corruptions of Scripture." He was buried in Westminster Abbey, where a monument was erected to his memory.

NEWTON, John, general and engineer, born in Norfolk, Va., Aug. 24, 1823; died in New York City, May 1, 1895. He graduated with honors from the West Point Military Academy in 1842, became an assistant professor of engineering in that institution, and entered the army at the beginning of the Civil War. He commanded the defenses of Washington and took part in the peninsular campaign. Subsequently he commanded at South Mountain, Antietam, and Fredericksburg, being promoted major general shortly after the last named engagement. Later he took part in the battles of Chancellorsville and Gettysburg, rendered service at the capture of Atlanta in 1864, and after the war became an engineer of the regular army. He was in charge of the workmen who removed the obstructions at Hell Gate, in East River, and in 1887 became commissioner of public works in New York City.

NEW ULM, a city in Minnesota, county seat of Brown County, on the Minnesota River, 28 miles northwest of Mankato. It is on the Minneapolis and Saint Louis and the Chicago and Northwestern railroads and is surrounded by a fine agricultural and dairying country. The noteworthy buildings include the county courthouse, the Saint Alexander Hospital, the Turverein Library, the Martin Luther College, the public library, and the high school. Among the manufactures are flour and grist, brick and tile, pottery, butter and cheese, cigars, lumber products, and machinery. It was settled by Germans in 1857 and incorporated in 1870. The Indians made a raid upon it in 1862 and a cyclone damaged it greatly in 1881. Population, 1905, 5,720; in 1920, 6,745.

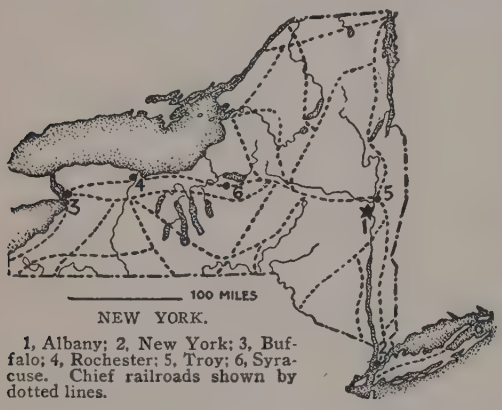
NEW WESTMINSTER (wĕst'mĭn-stĕr), a city of Canada, in British Columbia, 12 miles southeast of Vancouver. It is on the Fraser River, 15 miles from the Strait of Georgia, on the Canadian Pacific and other railways. The surrounding country is fertile and in its vicinity are extensive fisheries and canneries. Among the manufactures are machinery, canned fruits and fish, lumber products, and hardware. It has a public library, an asylum for the insane, a Dominion prison, and several schools and colleges. Electric lighting, sewerage, waterworks, and an electric street railway are among the public improvements. Population, 1921, 14,495.

NEW WHATCOM (hwŏt'kŭm). See **Bellingham.**

NEW YEAR'S DAY, the first day of January and of the year. It has been observed as a religious holiday from the time of the Julian reformation of the calendar. Since it occurs on the eighth day after Christmas, it is the festival of Christ's circumcision, and as such is celebrated by various religious denominations, though in many countries it is observed more particularly with festive rejoicing and for interchanging presents. Although the Egyptians, Jews, Mohammedans, Chinese, and Romans differed from us and from each other as to the day on which the year begins, they all made the first day of the year one of special interest.

It is observed more closely in religious services in European countries than in America, and in many it has been superseded by Christmas for the bestowal of gifts.

NEW YORK, one of the original thirteen states of the United States, popularly called the *Empire State*. It is bounded on the north by Lake Ontario and the Province of Quebec, east by Vermont, Massachusetts, and Connecticut, south by the Atlantic Ocean, New Jersey, and Pennsylvania, and west by lakes Erie and Ontario and the Niagara River, which separates it from Ontario. The northwestern boundary is formed by the Saint Lawrence River and it is separated in part from Vermont by Lake Champlain. It includes all of Long Island, which is



NEW YORK.

1, Albany; 2, New York; 3, Buffalo; 4, Rochester; 5, Troy; 6, Syracuse. Chief railroads shown by dotted lines.

separated from the mainland by the East River. The extent from north to south is 312 miles and from east to west, 326 miles. It is the largest of the Eastern States, having an area of 49,170 square miles, which includes 1,550 square miles of water surface.

DESCRIPTION. The surface is diversified, many portions being level or undulating plains, while others are hilly, and in the eastern part are a number of mountain groups and chains. In the northeastern part are the Adirondack Mountains, which rise abruptly from the shore of Lake Champlain, culminating in Mount Marcy, 5,344 feet high, the highest peak. These highlands are heavily timbered with spruce, pine, and the hard woods, and large tracts are still covered with primeval forests. In the southeastern part of the State, extending northward along the Hudson, are ranges of the Appalachian Mountains, which cross the border from New Jersey and Pennsylvania. Along the frontier of Massachusetts is the Hoosac Range. South of the Mohawk Valley and west of the Hoosac Range are the Catskill Mountains, which have a general elevation of 3,500 feet, but Slide Mountain, the highest peak, has an altitude of 4,205 feet. The region lying west of the mountainous section may be described as a plateau, having a broken surface along the border of Pennsylvania and sinking gradually toward the northwest. Through the central part of the State, from Albany to Buffalo, extends the Erie Canal. A small portion of the mainland and all of Long Island belong to the low and level Atlantic coast plain.

The State forms a notable watershed for five drainage systems, including those of the Delaware, the Hudson, the Mississippi, the Saint Lawrence, and the Susquehanna. Both the Delaware and Susquehanna rivers rise in the State and they drain a large part of the south central section. In the eastern part is the Hudson, which receives the inflow from the Mohawk and discharges into New York Bay. The northeastern part is drained through Lake Champlain into the Saint Lawrence River, which, in its upper course, receives the inflow from the Genesee, Oswego, Black, and Oswegatchie rivers. In the southwestern part the drainage is through the Allegheny River, a tributary of the Ohio, hence by the Mississippi system. In many places the streams pass through deep gorges and are characterized by waterfalls, including the Falls of the Mohawk, near Cohoes; the Taughannock Falls, near Cayuga Lake; the Niagara Falls, in the Niagara River; and the falls of the Genesee River, at Rochester. These and other falls and rapids furnish an abundance of water power.

The State has many lakes of much beauty and value in commerce. On the eastern border is Lake Champlain and directly south of it is Lake George, the latter being entirely within the State. Many fine sheets of water are distributed in the Adirondack Mountains, such as Saranac, Placid, and Tupper lakes. In the western part are lakes Cayuga, Seneca, Oneida, Owasco, and Keuka. Chautauqua Lake, in the southwestern corner, is celebrated as a summer resort.

The climate is marked by variations of heat and cold, the thermometer varying from a few degrees below zero to 100° above, and the average for the State is about 48°. In the southeastern part the temperature is quite equable, being influenced by the breezes from the Atlantic. All sections of the State have an abundance of rainfall, which is heaviest along the Hudson and lightest in the northwest, ranging from 30 inches in the latter to about 50 inches in the former. Heavy snows fall in winter, mostly in January and February.

MINING. The State has vast deposits of minerals, but the coal measures are not found in large sections, although the fields of Pennsylvania are of easy access. In 1922 the total coal products had a value of $7,845,500. It holds high rank in the output of salt, the quantity produced annually having the value of $3,600,000. In the output of mineral waters it is exceeded only by Wisconsin and it holds a high place in the production of pig iron. Large deposits of limestone are worked, and the quality is well suited for building purposes and the manufacture of Portland cement. Many clays of value

are found and much of the output is used in the manufacture of tile, brick, and pottery. Several counties in the western part of the State have extensive deposits of natural gas and petroleum. Slate is quarried profitably and marble and granite are obtained for building purposes and monuments. Other minerals include gypsum, zinc, copper, lead, and graphite.

Agriculture. Originally the State was covered by vast forests of pine, hickory, maple, oak, chestnut, walnut, sycamore, and other trees. Considerable forests still exist, but much of the surface has been cleared for pasturage and cultivation. It long ranked as the leading State in agriculture, but Illinois exceeded it in 1890, and since then it has been surpassed by other west central states. The land area included in farms is given as 75 per cent. and the average size of the farms is 99 acres. Hay is grown on a larger area than all other crops combined, owing to extensive interests in the live-stock industry. Oats holds rank as second in acreage, but is closely followed by corn and wheat. Other crops include buckwheat, potatoes, rye, beans, and tobacco. Some of the central counties grow large quantities of hops. The Hudson valley and the lake regions are noted for the superior quality of grapes. Floriculture is a source of much income. Gardening and small farming are conducted with much care in the vicinity of the larger cities.

New York has an important place in dairy farming and in the number of dairy cows it holds third rank. The value of butter and milk produced per annum is greater now than at any time in its history. While the larger investments are in dairy cows, considerable interests are attached to raising cattle for meat. Sheep are grown extensively and the wool clip averages about 3,200,000 pounds per annum. Horses of a fine grade for draft and farming purposes are raised, and considerable attention is given to the industry of growing swine and mules. The interests in growing poultry for meat and eggs are considerable.

Manufactures. The State has ranked first in the output of manufactured products since 1825, and manufacturing has been the principal industry for about a century. This enterprise is favored by its location near the vast coal fields of Pennsylvania and its valuable forests, which continue to yield large quantities of spruce, hemlock, and hard-wood timber. Other resources for manufacturing come from the mines, quarries, dairies, and farms. Fisheries of importance are located in the lakes and off the shore of Long Island. Among the catches are oysters, clams, menhaden, and bluefish, and much of the output is prepared for the market by curing and canning. The total manufactured products of the State per annum have a value of $8,750,000,000, nearly one-seventh of the output for the United States.

Clothing stands at the head of the list in the value of manufactures, but it is followed closely by the output of printing and publishing, textiles, sugar and molasses, and machinery. New York City is the greatest manufacturing center in the State and in the United States, but a large variety of products are obtained in Buffalo, Rochester, and Syracuse. Many of the streams furnish an abundance of water power, but Niagara Falls stands at the head of the list, whence the power is conducted to Buffalo and other manufacturing centers. Cohoes and Utica produce large quantities of rugs and carpets, Yonkers is a center of the knitting industry, Rochester produces many optical instruments and cameras, and Troy is a center for the manufacture of cuffs, collars, and shirts. Rochester was for many years the leading manufacturing city of flour, but it has given way to Minneapolis in this respect. Grist milling, cheese making, fruit canning, and slaughtering and meat packing are represented in a number of the larger cities. In the clothing industry the State has first rank, which is true likewise of the manufacture of butter and condensed milk. Other products include soap, confectionery, boots and shoes, lace goods, furniture, gloves and mittens, cigars, and chemicals.

Transportation and Commerce. The State outranks any other State in the Union in maritime commerce, though New York City is the only port on the Atlantic. About one-third of the exports and more than half of the imports of the nation pass through this port. A large commerce is carried on the lakes, both with Canada and other states of the Union, and the larger portion of this trade is through the port of Buffalo. Other navigable waters include the Saint Lawrence and Hudson rivers, Lake Champlain, and the Barge Canal, the latter extending across the State from east to west, connecting the Hudson River at Albany with Lake Erie at Buffalo. Other artificial waterways constructed by the State include the Oswego Canal and the Champlain Canal. These avenues for cheap transportation, together with the large population of the State, have operated to maintain the high position in commerce.

The Mohawk and Hudson Railway was opened between Albany and Schenectady, a distance of seventeen miles, in 1831. Soon after a line was completed between Albany and Buffalo, which parallels the Barge Canal. Lines now extend to all parts of the State, the total aggregating 8,675 miles. The New York Central and Hudson River Railway has a trunk line from New York City by way of Albany to Buffalo, where it is connected with affiliated lines extending to Chicago and Saint Louis. A large portion of this railway is double track and part of the system has four parallel tracks. Other railways within the State include the New York, Ontario and Western, the Erie, the Lehigh Valley, the West Shore, the Lackawanna, and the New York, Chicago and Saint Louis

railways. All of the larger cities have electric railways, providing extensive communication to urban, suburban, and interurban points.

EDUCATION. The per cent. of illiteracy for the total population over ten years of age is 5.1, but among native whites it is only .3. School attendance is compulsory between the ages of 8 and 16 years. The educational affairs are under the direction of a State board of 12 regents, who are chosen by the legislature for terms of 12 years, the term of one member expiring each year, and this board appoints a State commissioner of education, who is aided by three assistant commissioners, and these officers have general charge of all the special, secondary, and common schools. Normal education is provided by 16 public normal schools, at which about 6,000 students attend, and additional instruction is given in a number of high schools and academies. State aid has been extended to the district library system since 1838, giving all the pupils in school the advantage of good reading matter.

Although the State does not maintain a university, higher education is amply provided for in a large number of well-organized and heavily endowed institutions. Columbia University, in New York City, is one of the oldest and best known centers of learning in the country. Other institutions of a high character include Vassar College, Poughkeepsie; New York University, New York City; Colgate University, Hamilton; College of the City of New York, New York City; Cornell University, Cornell; Syracuse University, Syracuse; Union Theological Seminary, New York City; Union College, Schenectady; University of Rochester, Rochester; and Wells College, Aurora. West Point, on the Hudson, has the United States Military Academy. Many parochial schools and private institutions of learning are maintained.

The charitable and penal institutions are under the direction and management of boards of lunacy, corrections, and charities, each being appointed by the Governor and the senate. More than 500 institutions of this kind, having nearly 70,000 inmates, are supported by the State. Buffalo, Utica, Willard, Poughkeepsie, Middletown, Binghamton, Rochester, Ogdensburg, Flatbush, Ward's Island, Gowanda, and several other places have hospitals for the insane. Six penitentiaries are maintained, located respectively in the counties of Albany, Clinton, Erie, Kings, Monroe, and New York. Auburn, Clinton, and Ossining (Sing Sing) have prisons. Reformatories are located at Bedford (for women), Elmira, and Napanock. The larger cities, especially New York, have many workhouses for the confinement and employment of minor offenders. Ample provisions have been made for epileptics and other subjects of charity and benevolence.

GOVERNMENT. The State is governed under a constitution that was revised in 1894 and, after ratification by the vote of the people, it went into effect Jan. 1, 1895. It vests the executive authority in the governor, lieutenant governor, comptroller, secretary of State, treasurer, attorney-general, and State engineer and surveyor, all elected for two years. The other State officers, including those that have charge of educational and charitable institutions, are appointed by the Governor and confirmed by the senate. The Legislature consists of a senate and a house of representatives, known as the assembly. At present the senate consists of 50 members chosen for two years and the assembly has 150 members chosen annually.

The court of appeals is the highest judicial authority in the State. It is composed of a chief justice and six associate justices, all elected for fourteen years. Seventy-six judges constitute the supreme court, each elected for fourteen years, and they act in eight judicial districts. Other courts include those known as county courts, surrogate courts, and city courts. Local government is administered by villages, towns, and cities. Three classes of cities have been established by the Legislature and they are governed under general plans established by law. All cities having less than 50,000 inhabitants belong to the *third class,* those having between 50,000 and 250,000 are cities of the *second class,* and those having 250,000 or more inhabitants belong to the *first class.* The right to vote is restricted to those who have been citizens of the United States 90 days and residents of the State one year, of the county four months, and of the town or precinct thirty days.

INHABITANTS. The State of New York ranks first in population, in wealth, and in the number of educational institutions. Being the gateway at which a large foreign immigration is admitted, a considerable number of its inhabitants are foreign born. About two million of its inhabitants are of foreign birth, including principally Germans, Irish, Jews, and Italians. Albany, on the Hudson, is the capital. The principal cities include New York, Buffalo, Rochester, Syracuse, Albany, Troy, Utica, Yonkers, Binghamton, Schenectady, Auburn, Elmira, Newburgh, Cohoes, Poughkeepsie, Oswego, Kingston, Amsterdam, Jamestown, Lockport, Rome, Gloversville, Watertown, Middletown, Ogdensburg, Ithaca, Hornellsville, Hudson, Dunkirk, and Corning. In 1900 the population was 7,268,012, or 153 persons to the square mile. This included 4,627 Indians, 7,170 Chinese, and 99,232 Negroes. In 1905 the population was 8,066,672; in 1925, 11,162,151.

HISTORY. It is thought that Giovanni Verrazano was the first European to reach the region included in New York, since he discovered New York Bay in 1524. Henry Hudson, sailing in the *Half Moon* under the flag of Holland, discovered the river that bears his name, in 1609. In the same year Samuel Champlain, the founder of Quebec, made important explorations and

discovered Lake Champlain. The Dutch carried a trade in furs with the Indians until 1614 without attempting settlements, but in that year Fort Nassau was established and in 1623 New Amsterdam was founded, the former being the original name of Albany and the latter of New York City.

Four Dutch governors ruled in the region, including Minuit, Van Twiller, Kieft, and Stuyvesant, and in 1664 the colony was captured by the English and granted to the Duke of York. The English were ousted for a short time, in 1673, but all the remainder of the period up to the Revolution they remained in possession. In 1690 the first colonial congress met at Albany to consider Indian troubles and in 1700 Captain Kidd, the pirate, was captured. The people were about evenly divided between the American party and the Tories during the early struggle between the colonies and England, but the former rapidly gained in numbers and soon were in the majority. An independent government was organized, in 1775, and the following year a provincial convention was held at White Plains, at which was drawn up the constitution adopted in 1777.

New York ratified the Articles of Confederation in 1778, and throughout the Revolution gave support to the Americans. On July 26, 1788, a convention ratified the Constitution of the United States by a vote of 30 to 27. Many Tories settled in Canada after the close of the war, but the party lines between the Federalists and Democrats were closely drawn. During the early part of the Civil War a large party favored a peaceable settlement with the Confederate States, though the State did not possess slaves, but 467,000 troops were furnished to the Federal army.

NEW YORK, the largest city of America and the second city of the world, being exceeded in population only by London. It is located in the State of New York, at the mouth of the Hudson River, which flows through New York Bay into the Atlantic Ocean. Lower New York Bay is connected with Upper New York Bay by the Narrows, a strait which separates Staten Island from Long Island. This strait is about a mile wide and on its shores are forts Hamilton and Wadsworth. All large vessels that enter the inner harbor, known as New York Bay, must pass this strait. New York Bay is five miles wide and six miles long from north to south, and is one of the most beautiful and secure harbors in the world. Vessels may also enter the harbor from Long Island Sound through the improved Hell Gate Pass and the East River, and from the western side of Staten Island through Kill Van Kull, but both these passages are fitted only for ships of light draft.

Three small islands are situated in the harbor, these being known as Bedloe's, Governor's and Ellis islands. The celebrated Bartholdi's Statue of Liberty stands on Bedloe's Island and the United States government occupies Governor's Island. Immigrants from foreign countries are now received on Ellis Island, though formerly they landed at Castle Garden. Several islands are situated in the East River, known as Black-

Map of New York City, showing the surroundings, the Hudson River to Albany, and the source of the water supply.

well's Randall's, and Welfare islands, and these contain a number of charitable institutions under municipal authority.

DESCRIPTION. Originally New York was con-

fined on the Island of Manhattan, a tract of land included between the Hudson and East rivers. It is bounded on the north by Spuyten Duyvil Creek, northeast by the Harlem River, east by the East River, south by New York Bay, and west by the Hudson River. This island was purchased by Peter Minuit, director for the Dutch India Company, from the Indians in 1626 for $24. At present the city not only covers this tract, but extends far beyond into the State and includes a part of Long Island. Manhattan Island is about one and three-fourths miles wide and thirteen miles long. Eighteen miles south of Manhattan is Sandy Hook, where a bar separates the lower bay from the Atlantic Ocean. Southeast of Manhattan Island is the borough of Brooklyn, now a part of New York City, and west of it, across the Hudson, are Jersey City and Hoboken, both located in the State of New Jersey.

Greater New York consists of five boroughs, all of which were included by the charter of 1897. They include Manhattan, which includes all of Manhattan Island; Richmond, which consists of Staten Island; Brooklyn, which is coextensive with King's County on Long Island; Queens, located north of Brooklyn and east of Manhattan; and the Bronx, situated north of Manhattan and Queens. The area is as follows: Manhattan, 22 square miles; the Bronx, 40 square miles; Richmond, 57 square miles; Brooklyn, 81 square miles; and Queens, 117 square miles, making a total of 309 square miles.

Streets. The older part of the city, situated below Fourteenth Street, is covered most densely with buildings and has a number of tortuous streets. The remainder of the city is platted largely on a regular plan, has wide and uniform streets and avenues, and some of its thoroughfares rank among the finest and best improved in the world. Broadway is the great artery of business. In the business section it is only eighty feet wide, but its northern half has nearly double this width. Fifth Avenue, formerly an exclusive residential street of rich people, is devoted to business as far as Fiftieth Street, and north of that it is lined with fine residences, churches, and clubhouses. Some of the finest dwellings in the world are located on Fifth Avenue between Sixtieth Street and 100th Street, where no street railways are permitted. Between Seventh and Tenth avenues and along the Hudson, known as the West Side, are many tenements and numerous large manufacturing establishments. Along the East River, on the east side of Manhattan, is a district with great tenement houses. The most conspicuous section is near City Hall Park, where the buildings range from ten to thirty stories in height, some of them having cornices 340 feet above the pavement. This section extends south as far as Battery Park, the former site of Castle Garden, in which is located the Aquarium.

Wall Street, extending from Trinity Church, on Broadway, to the East River, contains the subtreasury and many banking houses. It is a narrow street and is so named from the wall which once defended New Amsterdam at this point, and in its vicinity are many of the larger and most massive buildings of the city. Other streets of note include the Bowery, Maiden Lane, Park Row, and 23d Street. Along the Hudson River is Riverside Drive, a boulevard noted for its private residences and apartment houses. The northern part of Manhattan and much of the Bronx are hilly and are formed largely of solid gneiss and limestone, hence tunneling and the leveling of streets are difficult and expensive, but no outlay of money has been spared in either of these enterprises. Richmond and the Bronx are mainly residence districts, while Brooklyn contains many business houses and manufacturing establishments as well as residences. The wholesale trade is centered chiefly on Broadway between Tenth and Chambers streets.

Parks and Squares. New York has many fine public parks and beautiful specimens of landscape gardening. Central Park contains 840 acres, of which nearly half is wooded, and is considered one of the most beautiful pleasure grounds in the world. Bronx Park, on both sides of the Bronx River, has an area of 660 acres and contains extensive botanical and zoölogical gardens. North of Kingsbridge is Van Courtlandt Park, containing 1,130 acres, in which are located a museum and many beautiful gardens and lakes. Near Baychester is Pelham Bay Park, the largest in the city, containing 1,750 acres. Morningside Park is located between 110th and 123d streets, Saint Mary's Park is at 149th Street, Crotona and Claremont parks are near the village of Tremont, and Prospect Park is in Brooklyn. Many small squares and parks are located in different parts of the city, such as Madison Square, Washington Square, and Union Square. Harlem Speedway, extending for two miles along the western bank of the Harlem River, is beautified by finely kept gardens and parkings.

Monuments. Those entering New York Bay are at once impressed with the Statue of Liberty Enlightening the World, presented to the United States by the government of France and located in the harbor on Bedloe's Island. Central Park is noted for its fine statues and monuments, including the obelisk presented to the city by the Khedive of Egypt, Ismail Pasha, and erected in 1880. At the entrance to Central Park is an equestrian statue of Simon Bolivar, the gift of Venezuela. Other statues in Central Park include one of Robert Burns, presented by resident Scotchmen, one of Sir Walter Scott, by John Steele, one of Alexander Hamilton, one of Professor Morse, and those of Schiller, Beethoven, Daniel Webster, Humboldt, and Thomas Moore. The tomb of General Grant is situated at the summit of the Riverside Bluff, a con-

(Opp. 1960)

PARK ROW BUILDING. SAINT PAUL'S CHAPEL. SAINT PAUL BUILDING.

spicuous point overlooking the Hudson, and Washington Arch is at the north entrance to Washington Square. South of Cooper Union is a figure of Peter Cooper by Saint Gaudens, in Union Square is a bronze statue of Lafayette by Bartholdi, and at the subtreasury in Wall Street is the colossal figure of Washington by Ward. Others of note include the statue of Roscoe Conkling, at Madison Square; the statue of "Sunset" Cox, in Astor Place; the statue of Garibaldi, in Washington Square; the statue of Hancock, near Central Park; the statue of Ericsson, at the Battery; the statue of Greeley, in City Hall Park; and the statue of Thorwaldsen, at the Sixth Avenue entrance to Central Park.

BUILDINGS. When approaching New York by river or bay, an extraordinary view is afforded of the high buildings of Manhattan Island, which constitutes one of the most impressive and interesting features of the city. The Produce Exchange near the Battery is a large structure of brick and terra cotta and has a tower 225 feet high. On Bowling Green, near the Produce Exchange, is the Customhouse, which occupies the former site of Washington's official residence. Both sides of Broadway from Bowling Green to City Hall Park are lined with massive and tall business structures, such as those of the Standard Oil Company, the Union Trust Company, the Manhattan, the Cunard, the Equitable, and the Commercial Cable Company. The subtreasury, a fine structure erected by the Federal government, is located on Wall Street and the city post office is in City Hall Park. The Park Row building, on Park Row, is 31 stories high and 390 feet from the street to the top of its towers, and was long the tallest building in the city. It is now exceeded in height by the Singer building, located on Broadway and Liberty streets, which has 42 stories. This structure is 612 feet high and has a total floor space of over nine acres. At the 23d Street intersection of Broadway and Fifth Avenue is the Flatiron building, a structure of 20 stories with 456 offices. The Metropolitan Life Insurance building has 48 stories and the top of the tower is 658 feet above the street. However, the Woolworth building is the highest in New York and in the world, having 51 stories and being 775 feet high.

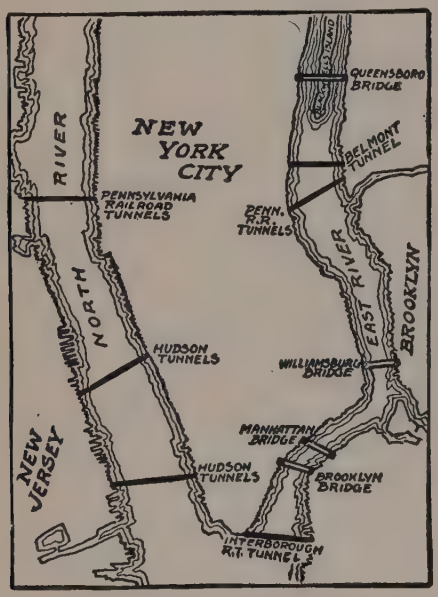
Trinity Church, on Broadway opposite Wall Street, is the most interesting ecclesiastical building. It occupies a site granted by the English government in 1697, but the present Gothic structure of brownstone dates from 1846. It is surrounded by a cemetery that contains the graves and monuments of many persons noted in American history. Near it is Saint Paul's Chapel, located on Broadway between Vesey and Fulton streets, the Episcopal place of worship at which Washington and others of pre-Revolutionary times attended. Grace Church, at Broadway and Tenth streets, is an ornate Gothic structure of white limestone. The Roman Catholic Saint Patrick's Cathedral, on Fifth Avenue, is the finest Gothic edifice in America. At Cathedral Heights is the cathedral of Saint John the Divine (Protestant Episcopal), a beautiful structure with a tower 445 feet high. Saint George's (Protestant Episcopal) Church is located at Rutherford Place. Other churches of note include the Saint James Lutheran Church, 73d Street; the Broadway Tabernacle, Fortieth Street; the Madison Square (Presbyterian), Madison Avenue; the First Church of Christ (Christian Scientist), 96th Street; the Madison Avenue (Reformed), Madison Avenue; and the Plymouth Congregational, Brooklyn.

New York City is noted as an educational center. The public schools are well organized and attended and many private and parochial schools are maintained. It is the seat of the College of the City of New York, Columbia University, the New York University, the Barnard College, the Saint John's College, the College of Saint Francis Xavier, the College of Physicians and Surgeons, and many professional and scientific schools and associations. Many circulating libraries are maintained in connection with the public library, and a number of branch libraries have been provided under a gift of Andrew Carnegie amounting to $5,200,000. The Mercantile Library has 435,000 volumes. Among those prominent in the library movement were John Jacob Astor, James Lenox, and Samuel J. Tilden, whose gifts were united and from the consolidated trust fund it has been possible to build up a city library with 900,500 volumes. The building in which this great library is housed is located on Fifth Avenue, between 40th and 42d streets, and the structure is 366 feet long and 246 feet wide. Large libraries are maintained by the public schools, colleges, universities, and many of the scientific and educational associations.

The city has about forty hotels that may be classed with the best in America, and in addition there are a great many that rank as good. The Waldorf-Astoria, on Fifth Avenue, is one of the largest and best known hotels in the United States. It has more than 1,000 rooms for guests, is sixteen stories in height, and its equipments are modern in every detail. Other hotels of note include the Pennsylvania, the Biltmore, the Netherland, the McAlpin, the Manhattan, the Murray Hill, and the Hoffman House. Among the great buildings may be classed the Metropolitan Museum of Art, on the east side of Central Park, in which are located very valuable and expensive collections. The American Museum of Natural History is situated in a fine building on the west side of Central Park, at 77th Street, and contains vast collections in natural history. Museums are likewise maintained by Columbia University, the Lenox Library, and other institutions. The Metropolitan Opera House, on Broadway, has a

seating capacity for 3,200 persons. Other noted theaters include the Criterion, the Casino, the Carnegie, the Daly's, the Knickerbocker, the Garden Theater, the Victoria, and the Urban Place Theater. As a whole the architecture of New York includes many structures of great value, but these impress with a feeling of awe rather than with a sense of beauty. They are not confined to the original limits of New York, but the former city of Brooklyn, now a part of Greater New York, has many schools, churches, office buildings, and institutions of various kinds that take a high rank in valtie and architectural completeness.

Bridges. Many bridges connect the different parts of the city, facilitating easy passage for pedestrians and for street railway and railroad purposes. A large number of bridges cross the



BRIDGES AND TUNNELS.

Harlem River, including the famous High Bridge, which is 1,460 feet in length. It is located at West 175th Street and near it is the High Bridge Park. At West 181st Street is Washington Bridge, which is 2,384 feet in length, and from it a fine view is afforded of Kingsbridge and Washington Heights. A number of great bridges cross the East River, connecting Manhattan Island with Brooklyn. These include the New York and Brooklyn Bridge, which has its Manhattan terminal at the City Hall Park. It is 5,989 feet long, has a river span of 1,600 feet, is 85 feet wide, and was erected at a cost of $15,000,000. The promenade is free, but a fare of five cents is charged to cross on the electric cars. About a mile north of it is the Manhattan Bridge, which has been in use some time, but it was not fully completed until 1908. It extends from Delancey Street, Manhattan, to Broadway, Brooklyn. The Williamsburg Bridge extends from Grand Street, Manhattan, to Williamsburg, Brooklyn. The Queensboro Bridge, which crosses the East River at 59th Street, was opened for traffic in 1909. It is 7,637 feet long and cost $20,000,000. At present there are five great bridges across the East River and communication is further facilitated by two tunnels between Manhattan and Brooklyn. Three tunnels under the Hudson connect the city with the shore of New Jersey.

Communication. Few cities equal New York in its convenient location for communication with other commercial centers of the United States and foreign countries. It has a natural harbor, extensive river and ocean traffic, and is the converging center of many railways. Among the lines entering the city are the New York Central and Hudson River, the Erie, the Baltimore and Ohio, the West Shore, the Pennsylvania, the Lehigh Valley, the Lackawanna, the New York, New Haven and Hartford, and a number of others. At 42nd Street is the great terminal station of the New York Central and other lines. The Pennsylvania Company constructed a tunnel under the Hudson River, which was completed in 1908, hence the trains now enter the great terminal station on 32d Street, between Seventh and Eighth avenues. Formerly this line and a number of others transferred passengers as well as freight by ferries from Jersey City to various points in Manhattan and Brooklyn, and numerous ferry lines are still maintained for transporting, but the construction of this tunnel has been a means of relieving the formerly congested conditions.

Intercommunication is by electric surface cars, electric elevated lines, and the subways, and in addition there are numerous lines of cabs, hansoms, and conveyannces by bus lines and automobiles. All the electric lines run both local and express trains, giving those who reside some distance from the central part of the city the benefit of rapid transit. The surface electric lines extend to all parts of the city and branches are operated to many points in the State and on Long Island, including the connections with Jamaica and Coney Island. The elevated lines extend from the Battery toward the north and branches cross the great bridges of the East River into Brooklyn. It may be said that New York has the most complete underground electric railway in the world. The original subway has been in operation since 1904, when it was completed at a cost of $36,500,000. An extension of this subway was completed to Brooklyn in 1908. The cars are operated and lighted wholly by electricity, and at intervals the tunnel is lighted by skylights in the center of the streets. In some places there are two and in other sections are four tracks, ranging from 25 to 50 feet in width, and the height is thirteen feet throughout. Many shops are lo-

cated in various places of the subway, particularly between 23d Street and the Battery.

Public Improvements. The streets are exceptionally well graded and paved. Much of the paving in the business center is of granite, while in the districts lying farther out it is of brick, asphalt, or macadam. Much care is taken to insure cleanliness and safety on the streets during business hours, hence inspectors and patrolmen are met with on all the thoroughfares. An adequate system of sewerage is maintained, and all the streets are well lighted, either with gas or electricity. Manhattan and the Bronx derive an excellent supply of water from the Bronx and Croton rivers through the Croton Aqueduct. The supply has been enlarged by the extension of branches to the Catskill Mountains, and a large quantity is stored in a number of natural lakes and artificial reservoirs. It is estimated that the daily consumption of water averages about 500,000,000 gallons, making it necessary to keep a supply stored so as to insure adequate service. Brooklyn derives its water supply from streams and wells on Long Island, and several large reservoirs are located in the eastern part of the borough and near Prospect Park. It is estimated that Brooklyn consumes daily about 180,000,000 gallons.

Publishing. New York is the largest book and newspaper publishing center of the United States. About 60 daily and 100 weekly papers are issued regularly. The total number of periodicals is placed at 875, including many in the German, Hebrew, Italian, and French languages. The *Commercial Advertiser,* founded in 1798, is the oldest daily newspaper issued in the city. Among the prominent dailies are the *Journal,* the *American,* the *World,* the *Sun,* the *Telegram,* the *Commercial Advertiser,* the *Tribune,* the *Times,* the *Evening Post,* the *Staats-Zeitung,* the *Jewish News,* the *Press,* the *Herold,* and the *Mail and Express.* Nearly all of the great magazines are issued in the city, such as the *Cosmopolitan,* the *Review of Reviews,* the *Everybody's,* and *Munsey's.*

Trade. With the port of New York are included the municipalities on the Hudson and New York Harbor, hence the trade credited to the city embraces a considerable traffic carried on at Jersey City and Hoboken. Nearly half of the total foreign trade of the United States passes through New York, giving it a commerce fully five times as large as that of any other city in America. While it controls to a large extent the trade between Europe and the region of the Great Lakes, it does not benefit by the commerce of the Gulf of Mexico and the southern coast of the Atlantic, which is carried through other ports with foreign countries. New York is an importer of silk goods, rubber and elastic goods, chemicals, sugar, coffee, tobacco, jewelry, and precious stones. The exports include flour, corn, live stock, cotton, copper, and machinery. Although it has a large foreign trade, the coast trade of New York is relatively much more valuable.

Manufactures. New York is the largest manufacturing center of North America. The output of the industries is more than fifty per cent. greater than that of any other city in the United States. About 28,500 manufacturing establishments are maintained and fully half a million persons are employed in them. Clothing is the leading product and much of the work is done in tenement houses and small workshops. Sugar and molasses are of next importance, and the output of printing and publishing stands next in the list. Brooklyn is noted for its large sugar and molasses refineries, for its machine shops and foundries, and for its large interests in roasting and grinding spices and coffee. Other products of the city include pipe tobacco and cigars, hardware, machinery, lace goods, fur goods, musical instruments, and electrical apparatus.

Government. The present charter was adopted in 1889, but it was revised by the State Legislature in 1901. It vests the chief executive power in the mayor, who is elected for four years by popular vote, and he is assisted by the heads of the different boroughs. The heads of fourteen administrative departments are appointed by the mayor, who may remove most of them, but certain officials are appointed by the heads of the boroughs. Legislative authority is vested in a board of 73 aldermen, who are elected for two years by districts, but the president of the board is chosen by the voters of the entire city. Any ordinances and resolutions passed by this legislative body may be vetoed by the mayor, but they may be passed over his veto by a two-thirds vote, though any measure requiring the payment of money cannot thus be passed without a three-fourths vote. The civil service rules apply to most departments of the city government, the appointments to office being largely from the lists of eligibles furnished by a commission.

History. The first European to land in the vicinity of New York was Giovanni Verrazano, a Florentine sailor, who discovered the Bay of New York in 1524. Henry Hudson, sailing under the direction of the Dutch East Indies Company, explored the river that bears his name in 1609, and a number of Dutch immigrants landed on Manhattan Island in 1614. New Amsterdam was founded by these Dutch settlers in 1623, but the British conquered it in 1664 and named it New York, in honor of the Duke of York. It was reconquered in 1673 and named New Orange, but in the following year it was restored to the British. The famous plot of Negro slaves to burn the city was discovered in 1741 and was followed by several executions. When the Revolutionary War began New York was less populous than Boston or Philadelphia. It was occupied by the British from 1776 to 1783, but in the latter year was

evacuated by them. From 1784 to 1797 it was the capital of the State, and from 1785 to 1790 it was the seat of the United States government. Its development after the Revolution was constant, growing not only in commercial importance, but gaining steadily as a center of political influence in the State.

Robert Fulton's steamboat, the *Clermont,* began to sail regularly between New York and Albany in 1807. A steam ferry was opened to Long Island in 1812, and steamers began to run regularly to various points on the Atlantic. In 1819 the *Savannah* crossed the ocean and the Erie Canal was completed about the same time, hence immigration and trade with the interior were greatly facilitated. Several disastrous fires and two cholera epidemics had a harmful influence and the Astor Place Riot occurred in 1849, in which 34 rioters were killed and many soldiers and citizens were wounded. In 1861 the people were greatly divided on the issues of the Civil War, but the city gave loyal support to the Union, furnishing 116,382 soldiers. The "Tweed Ring" perpetrated frauds upon the city for a number of years, but the leaders were convicted and the organization was broken up in 1871. Great distress was caused by the panic of 1873, but the city continued to grow without intermission.

Greater New York was organized under a law which went into effect Jan. 1, 1898, when the counties of Richmond and Kings, Long Island City, the towns of Newton, Flushing, and Jamaica, and a part of Hempstead in Queens County were united into one great city. The following is its population according to reports issued by the government: 1774, 22,861; 1800, 60,489; 1825, 166,166; 1850, 550,394; 1860, 813,669; 1870, 942,292; 1880, 1,206,590; 1890, 1,515,301; 1900, 3,437.202. In 1905 Greater New York had a population of 4,014,304; in 1925, 5,873,356.

NEW YORK, College of the City of, an educational institution of New York City, founded in 1847 and managed under the city board of education. It was first established as the Free Academy, but its prosperous growth caused it to be changed to the College of the City of New York in 1866. Originally it was open only to graduates of the public schools, but in 1882 the privilege of attendance was extended to those who have matured sufficiently to profit by the work. Tuition and the use of apparatus and text-books are special to students, who have the advantage of five courses of study. These lead to the degrees of B. A. or B. S. in the College of Liberal Arts and to corresponding degrees in other departments. The institution has a library of 85,000 volumes, 850 professors and instructors, and an attendance of 21,000.

NEW YORK UNIVERSITY, an institution of higher learning in New York, organized in 1830, formerly the University of the City of New York. The name was changed to its present form in 1896. The buildings are in three places, on Washington Square, on First Avenue between 26th and 25th streets, and at University Heights. Washington Square has a fine building of ten stories, of which the upper floors are occupied by the schools of law, pedagogy, and commerce, and the others are leased for business purposes. Instruction in medicine is given in the buildings on First Avenue. The site of University Heights, on the Harlem River, covers forty acres and contains a fine group of buildings, including the library, the hall of languages, chemical, physical, and biological laboratories, four dormitories, and buildings for engineering. In 1908 the University Heights Bridge over the Harlem was opened, connecting the 207th Street station of the subway with University Heights.

University College had its origin in 1829, when a number of public-spirited business and professional men met to consider "the establishment of a university in the city of New York on a liberal and extensive scale." University Graduate School, designed to complete the subjects commenced in the colleges, was begun in 1886 by twelve chairs announcing courses for graduate members. The work is carried on mainly at the Washington Square building, but for the scientific courses the laboratories at University Heights are used. All courses of instruction and examination leading to the degrees of master of arts, philosophy, or science, and doctor of philosophy, or science, are in charge of the Graduate School. The School of Applied Science is located at University Heights, which offers four years' courses in civil engineering, mechanical engineering, chemical engineering, and industrial chemistry. The School of Pedagogy was founded in 1888 and is one of the foremost institutions of the kind in the country. The collegiate division is maintained for teachers who have completed a college course in part. Other departments of the university include the University Law School, the University and Bellevue Hospital Medical College, the Summer School, the New York American Veterinary College, and the School of Commerce, Accounts, and Finance.

New York University is one of the foremost institutions of higher learning in North America. The faculty of law was planned by the Hon. B. F. Butler in 1835, then Attorney-General of the United States. John Taylor Johnston founded the law library, which has since been enlarged by David Banks and others. Six noted professors, including Drs. Valentine Mott and John W. Draper, organized the faculty of medicine in 1841. Samuel F. B. Morse, one of the professors, invented the recording telegraph in the old building on Washington Square. The total value of the property is $6,500,000. It has about 850 instructors and a library of nearly 180,000 volumes. In 1925 the attendance was over 17,000 students. These were distributed as follows: College, 226; Graduate

School, 481; School of Applied Science, 415; School of Pedagogy, 989; Washington Square Collegiate Division, 522; School of Commerce, 904; Summer School, 841; Law School, 917; Women's Law Class, 43; Medical College, 602; Veterinary College, 35. See **Hall of Fame.**

NEW ZEALAND (zē'lạnd), a colony of Great Britain in the South Pacific Ocean, located about 1,175 miles southeast of Australia. It consists mainly of three separate islands known respectively as North Island, South Island, and Stewart Island, though the latter is comparatively small. North Island has an area of 44,468 square miles; South Island, 58,525 square miles; and Stewart Island, 615 square miles. Chatham, Cook, Auckland, and a number of other small islets lie near the New Zealand group and are governed with it, the total area being 104,771 square miles. North Island is separated from South Island by Cook Strait, which ranges from 16 to 100 miles in width, and Stewart Island lies 25 miles south of South Island, being separated from it by Foveaux Strait.

Description. North Island has an undulating surface, diversified by low hills and extensive forests. Some of the mountains have volcanic peaks and the highlands have a general altitude of 4,500 feet. The highest peaks are Tongariro, 6,512 feet; Egmont, 8,315 feet; and Ruapehu, 9,200 feet. The shore is indented by a number of bays that furnish excellent harbors. South Island has a more compact form, lying as a parallelogram in a northeast and southwest direction. Much of its surface is highly elevated, including a lofty range of highlands known as the Southern Alps. Mount Cook, the culminating peak, has an elevation of 12,349 feet above sea level. The drainage is by small streams, all of which flow rapidly. Waikato, in North Island, is the largest river. It flows into Lake Taupo, located in the east central part, which has no outlet to the sea. On South Island are the beautiful lakes of Te Anau and Wakatipu, both in the southwestern part. New Zealand has a coast line of 3,000 miles, the larger part of which is in North Island.

The climate is equable and healthful, though it varies considerably with the location in latitude. There is a difference of about 10° between the north and the south, the latter being the colder section. The east coast has a rainfall of 27 inches, while the west coast has from 80 to 100 inches. Frosts are very uncommon in the north, but Stewart Island, on the south, has a moderately cold winter. The flora resembles that of Australia, though the acacia and eucalyptus are not represented, but the ferns and mosses are abundant. Pine, gum, and palms are the chief varieties of trees. No wild animals of large size are native to the colony, but beautiful birds of song and plumage are very numerous.

Mining. The report of the government places the value of minerals produced per year at $20,240,000. Gold is the most valuable and is followed closely by silver and coal. Gold is mined extensively in the districts of Otago, Westland, Auckland, and Nelson, and the output is more than one-half the total of minerals produced in the colony. It is secured to some extent from quartz, but a large share is mined by dredging in the bed of the Clutha River and other streams. Coal is mined largely for exportation. Other minerals include lead, antimony, quicksilver, and manganese. Clays suitable for brick and pottery and stone of a good quality are abundant.

Agriculture. About two-thirds of the surface is adapted to grazing and farming, and the interests vested in agriculture exceed those of any other industry. The soil is easily cultivated and the climatic conditions are more favorable to the growth of crops than in any part of Australia. Green crops, such as rape and turnips, are grown on a large acreage. Oats, wheat, and barley are the principal cereals. Other crops include hay, maize, potatoes, and vegetables. Tropical and semitropical fruits of all kinds are grown in abundance.

In proportion to the size of the colony, it exceeds all other countries in the extent of its sheep-raising interests. The number of sheep is placed at 20,125,000 head and the purpose is to produce meat rather than wool. Formerly the flocks were large and comparatively few in number, but the tendency now is to decrease the size and increase the number of flocks. Much of the mountain region is utilized for pasturage, being favored by a suitable climate and an abundance of rainfall. Large interests are vested in rearing horses and cattle. Dairy farming has shown a steady development in recent years. Swine and poultry are grown profitably.

Manufactures. The native materials for manufacturing have stimulated this enterprise. At present the largest investments are in wool scouring, meat freezing, lumber and grain milling, and butter and cheese making. Clothing and boot factories have attracted large investments and extensive iron and brass works are maintained. The general manufactures include cigars, clothing, earthenware, pottery, furniture, and machinery.

Transportation and Commerce. The railways aggregate 2,850 miles and practically all of them are owned and operated by the government. In 1918, the private railways did not exceed 125 miles. Electric railways are operated in the larger cities and some of the rural districts, and about 18,500 miles of telegraph lines are in use. The foreign trade is largely with Great Britain, the United States, and Germany. Among the principal exports are grain, wool, gold, frozen meat, kauri gum, lumber, and butter and cheese. The imports consist chiefly of sugar, tea, clothing, textiles, tobacco, and iron and steel goods. The dammar pine tree, from which kauri gum is obtained, furnishes considerable material

for exportation. According to the government reports the annual imports are valued at $50,000,000 and the exports, at $65,000,000.

EDUCATION. The government maintains a system of public education, which is presided over by a minister of a department. Attendance upon school is free and compulsory between the ages of seven and thirteen, but a small fee is paid by those who pursue secondary courses. At the head of the educational system is the New Zealand University, with which are affiliated five colleges located respectively at Auckland, Canterbury, Christchurch, Dunedin, and Wellington. A number of private and parochial schools are maintained, but the attendance is almost exclusively upon the public schools. About 325 public libraries are located in the colony, and a number of educational and scientific associations are well represented. The Anglican, Presbyterian, and Wesleyan churches have efficient organizations and a considerable number are classed as Roman Catholic. Effective missionary and educational work has been done among the natives for many years.

GOVERNMENT. The Governor is the chief executive officer. He is appointed by the British crown and is aided by a ministry of eight members. The legislative functions are exercised by the General Assembly, consisting of a legislative council and a house of representatives. Some members of the former were appointed for life prior to September, 1891, but since then the membership has been elected and the number is fixed at 44. In the house of representatives are 80 members, who are elected for three years, including four representatives of the native Maoris. The right to vote is universal, without distinction of sex. Local government is administered in town and road districts, in boroughs, and in counties.

New Zealand is noted particularly for its development of state and municipal ownership of public utilities. Many of the industries are organized on a basis of coöperation, and arbitration is compulsory in the adjustment of questions between capital and labor. The government has a fixed policy in encouraging the development of industrial arts, building railways and canals, and constructing interior and harbor improvements.

INHABITANTS. The density of population is about nine persons to the square mile. A large per cent. of the inhabitants are immigrants from England, Ireland, and Scotland, but quite a number of Germans and Scandinavians are included. The influx of Chinese and other colored races is restricted by the government. Wellington, on North Island, is the capital. Other important cities include Auckland, Christchurch, Dunedin, Invercargill, Oamaru, and Wanganui. In 1921 the total population was 1,270,910. This included 49,829 Maoris and 2,630 Chinese.

HISTORY. New Zealand was discovered in 1642 by Tasman, and in 1769 it was claimed for George III. by Captain Cook. Settlements were effected by Europeans in 1814, but material advancement in colonization was not made until 1833, when it was annexed for governmental purposes to New South Wales. In 1841 it was established as a separate colony, with a governor independent of the Australian colonies, and a constitution was adopted in 1852. The natives of New Zealand are a Polynesian people known as Maoris. Severe wars for the possession of the land occurred at various times, particularly in 1843. These natives were organized as tribes and formerly were numerous. Many have intermarried with the whites. Auckland was the capital up to 1865, but in that year the seat of government was removed to Wellington, which is the present capital.

The New Zealand University was established by an act of the General Assembly in 1870, and about the same time the government began to participate in the construction of railways. A compulsory school attendance law was enacted in 1876, general manhood suffrage was established in 1890, and the franchise was extended to women in 1893. As a means of encouraging agriculture, the government began to make loans to farmers on mortgages in 1894, and the following year a law was passed to prohibit homesteads from being mortgaged and sold for debt. A graduated tax on incomes was enacted about the same time. The laws now in force provide for an old age pension, accident insurance for workingmen, and the protection of children from working in mines and factories. New Zealand furnished men and supplies to support Great Britain in the Great European War.

NEY (nā), **Michel,** Marshal of France, born at Saarlouis, France, Jan. 10, 1769; executed in the Luxembourg Gardens, Dec. 7, 1815. He was the son of a cooper, enlisted in a regiment of hussars at Metz in 1787, and soon after the outbreak of the Revolution won rapid promotions, becoming colonel in 1794. At the Battle of Altenkirchen he commanded the advance guard under Kléber, and in 1798 captured Mannheim while commanding the right wing of the army under Hoche. In 1798 he was general of division in the Rhine campaign, and Napoleon soon after appointed him inspector general of cavalry. He became Marshal of France, in 1805, and gained a victory at Elchingen over the Austrians, took part in the battles of Jena and Eylau, and accompanied Napoleon on his celebrated invasion of Russia, conducting the rear guard in the retreat from Moscow. He was eminently conspicuous in the campaign of 1813, when he won a large part of the success at Lützen, and commanded in the battles at Bautzen and Dresden. When Napoleon abdicated in 1814, Ney took the oath of allegiance to Louis XVIII., and was sent at the head of an army of 4,000 men to check Napoleon on his return from Elba. However, when Ney saw his old commander he at once led the troops to Napoleon's side, and soon after opened the way to Paris. He com-

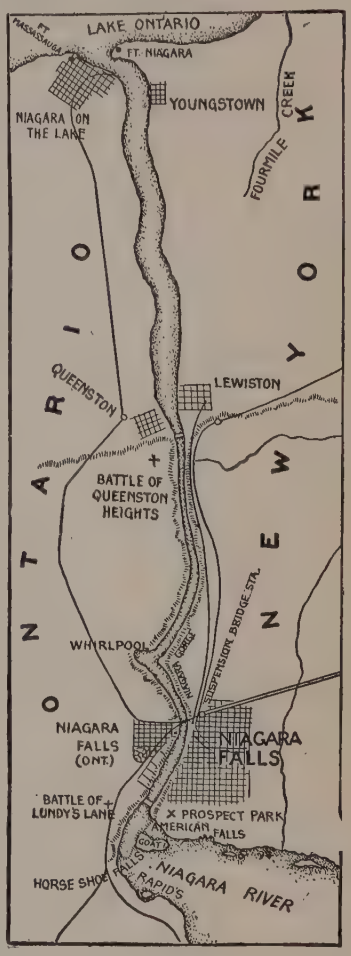
manded the center of the army at Waterloo, where five horses were shot under him, and after the defeat he entered Paris. When the allies captured Paris he fled to Switzerland, but he was soon after arrested as a traitor and on Dec. 5, 1815, was convicted of high treason by the English house of peers.

NEZ PERCÉS (nā pĕr'sāz), or **Shahaptians,** an Indian tribe of North America, resident in Idaho at the time that region was first explored. They were generally friendly to the whites and in 1854 disposed of a part of their land, but in 1877 difficulties arose about a reduction of their reservations. Soon after a number of them were transferred to Indian Territory, now Oklahoma, while others remained in Idaho or settled in Washington.

NGAMI (n'gä'mē), a lake situated in South Africa, at the northern extremity of the Kalahari Desert, east of German Southwest Africa. It is sixteen miles wide, sixty miles long, and 2,650 feet above sea level. The rainy season causes it to rise materially, when its water is fresh, but it becomes brackish in the dry season. It receives the water of the Kubanga and the outflow is carried into the Makarikari Salt Basin. The existence of lakes in this region of Africa was known in the time of Herodotus, but explorations of note were not made until 1849, when Livingstone supplied authentic information regarding the natural aspect of that section of Africa.

NIAGARA FALLS, a city of New York, in Niagara County, on the Niagara River, 22 miles west of north of Buffalo. It is on the Wabash, the Erie, the New York Central, the Grand Trunk, and other railroads. Communication by electric railways is maintained with Buffalo, Kingston, Queenston, and other points of interest. It is connected with Canada by a cantilever and two arch bridges and by a stone bridge with Goat Island. The noteworthy buildings include the De Veaux College, the Carnegie public library, the Niagara University, and many public schools and churches. Prospect Park is a fine public resort. Among the manufactures are flour, paper, gas, machinery, lumber products, earthenware, cooperage, chlorine, graphite, edged tools, wearing apparel, and utensils. Pavements, waterworks, electric lights, and street railways are among the improvements. Extraordinary water power is derived from the Niagara Falls and River. The city is a favorite center for sightseers, who visit the Falls on the Niagara River. It was chartered as a city in 1892, when the former villages of Suspension Bridge and Niagara Falls were united. Population, 1925, 57,033.

NIAGARA FALLS AND RIVER, a falls and river of North America, situated between Ontario and New York. The Niagara River flows from Lake Erie into Lake Ontario, being the outlet of lakes Erie, Saint Clair, Michigan, Huron, and Superior. It is 34 miles long and at its beginning is 326 feet higher than the level of Lake Ontario, into which it discharges. Several islands are in the upper course of the river, including Grand Island, which is about nine miles long. The distance from Lake Erie to the city of Niagara Falls is 16 miles. Grand Island divides the water into two nearly equal channels, which reunite and form a channel about two and a half miles wide. Here the water flows quietly for a short distance, but it narrows immediately above Niagara Falls and causes the Rapids, which is soon divided by Goat Island, on each side of which the water falls by two cataracts, known respectively as the American Falls and the Horseshoe, or Canadian, Falls. In the course of the Rapids the river descends 52 feet, forming a prelude to the majestic cataracts, where the water descends with great force over the nearly perpendicular rocks.



The American Falls, on the east side, has a width of 1,120 feet and a descent of 167 feet, while the Canadian Falls, on the west side, has a width of 2,125 feet and a descent of 158 feet. Massive rocks have prevented the water from excavating at the foot of the American Falls, but a great basin has been cut immediately below the Canadian Falls. This basin has the effect of causing the waters to flow smoothly, permitting the *Maid of the Mist,* a small steamer, to approach close to the cataract. At the upper part of the Falls the water has an average depth of about four feet, but in some places at the apex it is fully 20 feet, and the volume sweeping over the crest is estimated at 15,000,000 cubic feet per minute. After leaving the basin below the precipice, the water rushes with great rapid-

ity down the channel, here known as the *Gorge,* the sides being formed of nearly perpendicular walls of rock. Three massive bridges span the Gorge near the Falls, the first of which, nearly opposite Prospect Park, is a steel arch structure for carriages, pedestrians, and electric cars. A short distance below, between Suspension Bridge Station and Niagara Falls, Ontario, are two railroad bridges, the first of these being a cantilever bridge of the Michigan Central Railway and the other being a steel arch bridge of the Grand Trunk Railway. The latter of these was built to replace the former suspension bridge.

The Gorge has a total length of seven miles, in which the water falls about 100 feet. It descends with a velocity of 30 miles an hour and pours through the narrow confine with a terrific roar. The channel widens about midway in the Gorge, forming the celebrated Whirlpool, a circular basin worn in the rocks by a constant whirling of the water. Here the stream rests awhile, circling around in sullen whirl. Sometimes huge floating logs are seen tossing their ends high in the air, to be sucked down only a moment later into the vortex of the maelstrom. The waters find their exit at the lower side of the Whirlpool, where they spring into motion afresh, but the velocity decreases gradually as the stream approaches the Ontario plain, at Lewiston, which is about seven miles from Lake Ontario. Immediately above Queenston the river is spanned by a suspension bridge, which is crossed by the Great Gorge Railway, an electric line that stretches along the heights in Ontario, but extends the entire distance from Lewiston to Niagara Falls, N. Y., on the American side at the foot of the walls of the Gorge.

Goat Island is well wooded and beautifully improved with walks and drives. It is reached from Prospect Park by two stone bridges, each crossing a subchannel from the American side. A constant wear of the rocks by the action of the water, which has gone on for ages, causes the Falls to recede slowly toward Lake Erie. The United States government controls the land immediately adjoining the Falls on the New York side, while the Canadian side is a reservation of the Dominion government, the purpose being to preserve the immediate vicinity in its natural state. Many points of interest may be seen along the course of the Niagara River, including, besides the Falls, the grounds of the Battle of Lundy's Lane, the Gorge, the Whirlpool Rapids, the Whirlpool, the vicinity of the Battle of Queenston Heights, and Fort Niagara. A tunnel has been excavated from Table Rock, on the Canadian side, to a point immediately below the margin of the Horseshoe Falls, enabling tourists to view the great descent of water at close contact. Father Hennepin discovered Niagara Falls in 1678, and a Swedish naturalist named Kalm published the first account of it in 1751. It is so named from an Iroquois word, meaning the *Thunder of Water.* An immense volume of power is utilized for industrial purposes, many sluiceways and tunnels having been constructed for that purpose on both sides of the cataract.

NIAGARA SERIES, a geological formation represented largely in North America, forming the lowest division of the Silurian system of rocks. It is so named from its typical development along the Niagara River, whence the deposits extend northward into Canada and southward as far as Alabama. Rocks of this series are found in New York, Virginia, and in many places of the central part of the Mississippi valley, especially in Kentucky, Missouri, and Illinois. In the vicinity of Birmingham, Ala., one of the formation bears red hematite iron ore, hence has given rise to a large industry in steel. In New Brunswick and New Foundland it is thicker than in New York, ranging several hundred feet. The limestone obtained from these deposits is used extensively for building purposes. In many places the deposits abound in fossils, such as shells, ferns, and the trunks of trees.

NIBELUNGENLIED (nē'bẹ-lo͝ong-ẹn-lēt), a noted German epic poem, dating from the Middle Ages and constituting one of the most celebrated productions in the world's literature. It was written in the High German dialect, but its authorship is unknown, though it is generally assigned to the early part of the 13th century. It is reasonably certain that some of the material constituting the poem originated in the 12th century. This literary product reached its greatest popularity among the Germans in the 16th century. According to a critical analysis made by Wilhelm Karl Grimm (q. v.), it is a compilation of rhapsodies and songs that existed for many generations, all of which have been presented with a remarkable simplicity, though some of them are not connected closely in all of their parts. The story of the Nibelungenlied is to the effect that Siegfried, heir of the King of the Netherlands, came into possession of the fabled treasure of the Nibelungs, and that this constantly bore evil to its owner. He became the husband of Kriemheld, sister of the King of Worms, the celebrated Günther. The latter was desirous of winning Brunehilde of Iceland, and Siegfried came to his assistance by substituting himself for Günther. A dispute now arose as to whether Günther or Siegfried was the greater, by which the jealousy of Brunehilde became aroused, and she accordingly induced Hogan, a vassal of Günther, to murder Siegfried.

The death of Siegfried was long mourned by Kriemheld, but after some years she was married to Attila, King of the Huns. She had come into possession of the treasure of the Nibelungs after the death of Siegfried, but this was secured from her by Hogan, who succeeded in casting it into the Rhine. Kriemheld still

(Opp. 1968.)

GRAND TRUNK DOUBLE-TRACK STEEL ARCH BRIDGE OVER NIAGARA RIVER.

Notice the electric railway along the west bank of the river and the Falls of the Niagara in the distance.

mourned the death of Siegfried and could not be reconciled. To secure revenge she invited her brother and his court to pay her a visit, which he did with 11,000 Burgundians. The poem is devoted after this to an account of a long contest that followed, in which many of the Burgundians lost their lives. However, Kriemheld finally slew her brother with the sword of Siegfried, but she was herself slain by the aged warrior Hildebrand. The exact location of the Nibelungs' treasure has not been revealed, since Hogan took an oath not to give any information regarding the place, but it is still supposed to lie secure at the bottom of the Rhine. Many valuable manuscripts which are associated with this poem are extant, some dating from the 13th century, and numerous translations have been made into other languages.

NICAEA (nī-sē'ȧ), or **Nice**, anciently an important city of Asia Minor, situated in Bithynia, on Lake Ascania It was founded in 316 B. C. by Antigonus, who named it Antigonia, but later its name was changed to Nicaea by Lysimachus in remembrance of his wife. This interesting city was the seat of an ecumenical council under Emperor Constantine, in 325 A. D., and another under Empress Irene in 786. It was made the capital of the Greek possessions by Emperor Theodorus Lascaris in 1204, remaining the seat of Greek emperors until 1261, when they recovered Constantinople from the Latins. Nicaea fell into the possession of the Turks in 1330 and has since remained a part of the Ottoman Empire. The population at present is about 1,200, but the place is known as Isnik. See **Nice, Councils of.**

NICARAGUA (nē-kȧ-rȧ'gwȧ), a republic of Central America, lying south of Honduras, west of the Caribbean Sea, north of Costa Rica, and east of the Pacific Ocean. It comprises thirteen provinces and has an area of 49,200 square miles. The interior has a chain of mountains trending from the southeast to the northwest, and along the Pacific coast are ranges of mountains that contain many volcanic cones, some of them rising 7,000 feet above sea level. The central chain of mountains forms a great watershed and east of it is an extensive plain. Among the principal rivers are the Bluefields, the Maiz, the San Juan, and the Grande. The coasts are indented by a number of bays and furnish good harbors, including that of Corinto, one of the best on the Pacific. It has several fine lakes, the principal ones being Nicaragua, Managua, and Pearl Lagoon. The climate is varied according to differences in elevation above sea level and proximity to the sea, though in the main it is tropical. As a whole the country has an abundance of rainfall, but the precipitation is scant during the summer season in the mountain districts.

The climate is generally favorable to the growth of cereals and in most parts to man, but in the swampy regions of the Caribbean coast it is unhealthful and malarial. A large part of the surface is fertile, with a reddish clay soil on the Caribbean coast and a deep black soil in the west. The country has an abundance of excellent timber, including logwood, cedar, Brazil wood, and mahogany. Large quantities of hardwood lumber are obtained in the mountains and along the streams. The pastures are excellent. Large herds of cattle and sheep are reared and considerable interests are vested in the rearing of horses, ponies, mules, and swine. The principal crops consist of coffee, cotton, corn, sugar cane, rice, tobacco, vegetables, and many varieties of fruits. Indigo, gum arabic, ginger, India rubber, aloes, sarsaparilla, and copal are produced in abundance. The minerals embrace iron, gold, silver, copper, lead, granite, and limestone. Interior trade is carried chiefly by wagons and pack mules and only 250 miles of railroads are in operation. Many of the natural resources are still undeveloped and the country affords vast opportunities for energy and capital, the varied climate and different localities offering favorable openings for both.

The government of Nicaragua is administered under a constitution proclaimed in 1894. It is modeled after the Constitution of the United States. Both the president and vice president are elected for terms of four years by manhood suffrage. The legislative functions are vested in a congress of one department, which is constituted of forty representatives, who are elected for terms of two years by popular vote. A supreme court is the highest judicial tribunal, but each of the thirteen departments has courts of second instance and other minor courts. The country has a national militia of 5,000 men, with a reserve force of 10,000 men. Nicaragua took an active interest in advocating the organization of the Republic of Central America, a union of the Central American countries, although this wholesome scheme did not meet with a generally favorable reception. Schools are maintained under government grants and taxation, but the educational affairs are still in a very backward condition. About 1,500 elementary schools are maintained. A number of high schools flourish in some of the towns and cities, but much of the instruction is given in Catholic parochial schools. Several institutions of higher learning have been endowed by the government. Roman Catholic is the prevailing religion and the language is Spanish.

The region included in Nicaragua was occupied by the Aztecs at the time Columbus sailed along its coast in 1502. These natives were advanced materially in agriculture and other arts. In 1522 the country was conquered by Pedro Arias de Ávila, the governor of Panama, and the city of Granada was founded by Spaniards in 1524. It belonged as a dependency to Guatemala from 1560 to 1821, securing its independence from Spain in the latter year. Since then it has had a number of revolutions. A dispute

concerning the Mosquito Coast arose with Great Britain in 1841, but it was settled by a treaty in 1850, when the British ceded all rights of a protectorate to Nicaragua. Corinto is the principal seaport on the Pacific. Greytown, on the Caribbean Sea, has a large foreign trade. The foreign trade is chiefly with the United States, Germany, Great Britain, and France. Many of the coffee estates are under the ownership of German syndicates. Managua, on the southern shore of Lake Managua, is the capital. The principal cities include Leon, Granada, Managua, Masaya, Corinto, Chinandega, and Bluefields. Population, 1922, 692,650.

NICARAGUA, Lake of, a body of fresh water near the western coast of Nicaragua, Central America. It is from 28 to 45 miles wide, 108 miles long, and 108 feet above the Pacific, from which it is separated by a low range of hills, which is only eleven miles wide at its narrowest point. The San Juan forms its outlet into the Caribbean Sea. It is united with Lake Managua by the Tipitapa River. The lake contains a number of islands and is the seat of considerable steamboat commerce, being on the route of the principal traffic across the isthmus. A good highway extends from the western shore to the Pacific, passing through the town of Rivas. Lake Nicaragua is on the route proposed for the Nicaragua Canal.

NICARAGUA CANAL, a projected canal across Central America, which is designed to begin at Greytown, thence run southwest to

ROUTE OF PROPOSED NICARAGUA CANAL.

Ochoa, on the San Juan River, and thence pass up that river into Lake Nicaragua. A passage from the lake to the Pacific Ocean is to be effected by a canal running from La Virgen to Brito, thus providing a route with a total length of 170 miles from Greytown on the Caribbean Sea to Brito on the Pacific. This plan necessitates making excavations about 29 miles of the distance and utilizing for 121 miles the San Juan River and Lake Nicaragua, 65 miles in the former and 56 in the latter. Six locks are planned between the Caribbean Sea and Lake Nicaragua and two between the latter and the Pacific. In 1902 the United States purchased the French holdings in the Panama Canal, on which active work was commenced soon after, and it is not probable that the Nicaragua Canal will ever be built.

NICE (nēs), a city of France, in the department of Alpes-Maritimes, of which it is the capital. It has a good harbor and convenient railroad connections. The favorable climate makes it a popular winter resort for persons in search of health. Among the manufactures are silk and cotton goods, machinery, oil, confectionery, flour, paper, chemicals, and utensils. The cathedral, known as the Church of Notre Dame, is one of its principal buildings. Other important buildings include the public library with 100,000 volumes, the Museum of Natural History, an astronomical observatory, the lyceum, and many schools and churches. It has a number of statues, including those of Garibaldi and President Carnot. The public utilities include waterworks, a system of sanitary sewerage, stone and macadam pavements, and electric street railways. It has a considerable export and import trade. Nice was founded at an early date by a colony from Massalia, and in the 2d century B. C. became a Roman possession. Subsequently it was conquered by the Visigoths. It passed to the dukes of Savoy in 1388 and remained a possession of their descendants until 1860, when it became French territory. Population, 1906, 134,232; in 1921, 142,940.

NICE, or Nicaea, Councils of, the name of two ecclesiastical councils held at Nicaea, in Asia Minor. The first was convened in 325 by Emperor Constantine, at which 318 bishops attended. It was called to settle the Arian controversy, which had arisen in regard to the doctrines of the Trinity. This council condemned Arius, a parish priest of Alexandria, formulated the Nicene Creed, and determined when Easter should be observed. The second council convened in 786 and is counted the seventh ecumenical council. Empress Irene and her son Constantine called the council to determine the question of using pictures in worship. About 375 bishops attended, chiefly from Greece, Thrace, Sicily, and Italy, and after much discussion the council sanctioned such use of pictures in worship. See **Iconoclasts.**

NICENE CREED (nī'sēn), the formula of the Christian faith adopted at Nicaea, in Asia Minor, by the Council of Nice in 325. This confession of faith was reaffirmed at Constantinople in 381 and is the second of the ancient creeds, having been preceded by that of the Apostles. It is acknowledged at the present time by the Roman and Greek Catholic and most

Protestant churches. This creed defines the doctrine of the Trinity and asserts that the Son is of the same essence or substance as the Father. The Eastern Church, in the article on the Holy Spirit, uses the form which reads "And I believe in the Holy Ghost, who proceedeth from the Father," while the Western Church says, "Who proceedeth from the Father and the Son."

NICHOLAS (nĭk'ô-lâs), the name of five popes of Rome, who reigned between 858 and 1455. Nicholas I. succeeded Benedict III. in 858, being elected as the choice of the clergy. The notable events of his reign include his support of Ignatius, the unjustly degraded patriarch of Constantinople. He espoused the cause of Lothaire, King of Lorraine, in regard to the divorce from his wife, Theutberga, and used his prerogatives to maintain the right of the bishops to appeal to Rome. He died Nov. 13, 867, Hadrian II. being his successor. Nicholas II., surnamed Gerard, was chosen to succeed Stephen IX. on Dec. 28, 1058, and died at Florence in June, 1061. Nicholas III. succeeded John XXI. as Pope on Nov. 25, 1277, and died suddenly on Aug. 22, 1281. Nicholas IV. was born of humble parents at Ascoli, became Pope Feb. 22, 1288, and died April 4, 1294. Nicholas V. was born in 1398, and died on March 24, 1455. He was educated at Bologna, became a tutor at Florence, and in 1446 was sent on an embassy into Germany, being in the same year made a cardinal. In 1447 he was elected Pope to succeed Eugenius IV. It was his aim to make vast architectural improvements at Rome, a purpose upon which he entered by building several cathedrals, improving its thoroughfares, and repairing the fortifications. He is the Pope most intimately associated with the revival of learning by giving support to educational enterprises. It was his practice to retain and encourage scholars, and he was the founder of the Vatican Library. His reign did much to restore the luster of the Papacy. No unfortunate events disturbed his administration, though an effort to establish fraternal relations between the Western and Eastern princes failed. See **Pope**.

NICHOLAS I., Emperor of Russia, born in Saint Petersburg, July 6, 1796; died there March 2, 1855. He was the third son of Paul I. and a princess of Württemburg and received a careful and liberal education, which included practical work in economics and military science. In 1816 he made an extended tour through the Russian provinces and European countries, and the following year married the eldest daughter of Frederick William III. of Prussia. His eldest brother, Alexander I., died on Dec. 1, 1825, and his other brother, Constantine, resigned his rights in favor of Nicholas, who thereupon became the ruling sovereign. Shortly after an insurrection occurred, which he suppressed with remarkable vigor, and immediately after he devoted much zeal to the establishment of civil and educational reforms. He gave marked attention to the enterprise of founding schools, codifying the laws, and encouraging industrial development. A war with Persia was concluded in 1828, by which Russia acquired considerable territory, and other dominions were added soon after by a successful war against Turkey.

Nicholas quashed an uprising of the Poles in 1830 and reduced Poland to a Russian province, making it his object to destroy Polish nationality. He was noted as a man of great frugality, temperance, and patriotism, and received the plaudits of all the Russians, but the losses resulting from the Crimean War caused at least a partial loss of public regard.

NICHOLAS, Grand Duke, born in Russia in 1857. From 1895 to 1905 he was inspector general of cavalry, but remained at St. Petersburg during the Japanese War, and subsequently he had command of the military forces at St. Petersburg. In 1914 he was made commander-in-chief of all the Russian forces, but after the retreat from Galicia and Poland in 1915, he was superseded by the Czar and made governor-general in the Caucusus.

NICHOLAS II., Czar of Russia, born in Saint Petersburg, May 18, 1868. His parents were Alexander III. and a daughter of the King of Denmark, who provided well for his education. He succeeded to the throne at the death of his father, on Nov. 1, 1894, and on the 26th of the same month married Princess Alix of Hesse-Darmstadt. The official coronation took place on May 26, 1896, and was witnessed by representatives of nearly every government. His policy favored greater liberality in the government. He supported vast railroad enterprises, promoted the construction of canals and the founding of educational institutions, and encouraged the enlargement of Russian power in Asia. Being himself thoroughly trained in industrial arts, he displayed much interest in all enterprises designed to substantially develop the natural resources of his vast possessions. In 1898 he suggested the peace conference at The Hague. Russia was unfortunate in the war with Japan, in 1904 and 1905, which was followed by a revolution. In 1914 he joined the Triple Entente and in 1917 was compelled to abdicate. He was imprisoned at Tobolsk and later at Ekaterinburg and in 1918 was shot by Bolsheviki officers.

NICHOLAS II.

NICHOLAS, Saint, a saint who is regarded with much reverence by the Roman and Greek Catholic churches, but especially by the latter, which venerate him as the patron saint of the

Russians. He was a native of Patara, in Lycia, and became one of the early bishops of Myra. His early life and work in the Christian cause are wrapped in tradition, but it is reasonably certain that he was imprisoned by Diocletian for his devotion to reformatory work and that he was liberated by Constantine, when he returned to Myra. Subsequently he attended the Council of Nice and shortly after died a natural death, his remains being removed to Bari, in Apulia. Saint Nicholas is regarded the special patron of the young and of scholars. Some think that "Santa Claus" originated from him, the term being a corruption of his name. His feast is held on the 6th of December, when little presents and sweetmeats are given to children by a person in the appearance and costume of a bishop, after which the regular services follow. Writers commonly assign 340 as the year of his death.

NICIAS (nĭsh'ĭ-ăs), a statesman and general of Athens, son of a wealthy citizen named Niceratus, who became distinguished in the Peloponnesian War. He represented the aristocratic faction that was opposed by Pericles, and, after the death of that democratic leader, he came into prominence as an opponent of Cleon. His popularity was enhanced by victories over the Spartans and by his capture of the island of Minoa, in 427 B. C. He captured the island of Melos in 426 B. C., occupied the coasts of Locris, and about the same time defeated the Corinthians. In 415 B. C. a great naval expedition against Sicily was instigated by Alcibiades, of which Nicias was made commander, but the enterprise met with disaster, his fleet being destroyed and his army being compelled to retreat to the interior of Sicily. In 413 B. C. Nicias and his troops were forced to surrender and he was executed.

NICKEL, a metallic element discovered in 1751 by Axel Frederick Cronstedt (1722-1765). It is usually found associated with cobalt. Nickel is hard, ductile, malleable and magnetic, and has a grayish-white color. It may be alloyed with tin, copper, arsenic, and gold. In 1879 Fleitmann, a German chemist, discovered that nickel may be easily drawn and rolled when mixed with a small per cent. of magnesium. Previous to that time it had been used almost exclusively in preparing German silver, which is still its most important alloy, but it is now employed in the arts as an ingredient of many alloys, including coins, and for coating the soft metals by electrolysis. Nickel was formerly produced most extensively in Germany, France, Norway, and Hungary, and is still secured there in considerable quantities, but within recent years the largest output has been in Canada, where the annual production has a value of $1,850,000. The Canadian mines are situated mostly in Ontario, at Sudbury and Cobalt, and yield fully half of the world's supply. Productive deposits are worked in Missouri and elsewhere in the Ozark Mountains. The addition of about three per cent. of nickel to steel has been found to greatly strengthen it. Nickel steel is now used extensively in the manufacture of high grade bicycle tubing, crank shafts, engine forging, and for armor.

NICOBAR ISLANDS (nĭk-ō-bär'), a group of small islands in the Indian Ocean, located 125 miles northwest of the northern part of Sumatra. They extend from southeast toward the northwest and appear to be the summits of mountains that extend above the surface of the sea. The area is 635 square miles. Great Nicobar, the largest island, has a surface of 337 square miles. About twenty islands are included in the group, of which twelve are inhabited by people who are low in the state of civilization, consisting mostly of Malayans. The products include sugar, rice, bamboo, oranges, cocoanuts, and copra. Denmark acquired these islands in 1756, but the colony was unsuccessful and was abandoned. Great Britain annexed the group in 1869. Population, 1922, 6,412.

NICOTINE (nĭk'ō-tĭn), a poisonous, colorless, oily liquid alkaloid obtained from the leaves of certain plants, especially tobacco. It forms acrid and pungent salts when combined with acids. The amount contained in tobacco varies from two to eight per cent.

NIEBUHR (nē'bo͝or), **Barthold Georg,** German historian, born in Copenhagen, Denmark, Aug. 27, 1776; died Jan. 2, 1831. He was the son of Karsten Niebuhr, a noted geographer and traveler, studied law at Göttingen, and took a philosophical course at Kiel. Subsequently he pursued the study of natural sciences at Edinburgh. He married in 1800 and located at Copenhagen, where, in 1804, he became director of the National Bank. Two years later he left the Danish service to accept a similar position under the Prussian government, but later was made the German minister to Holland. He became professor at the University of Berlin in 1810, where he lectured on Roman history with eminent success, establishing a reputation as an original and philosophical historian. In 1816 he was made the German ambassador at the papal court, in which position he served until 1823, occupying himself at leisure times in historical research. Subsequently he settled at Bonn, where he lectured on ancient history at the university, and in the meantime pursued the writing of various treatises and publications. His principal works embrace "Roman History," "Grecian Heroes," "Constitution of the Netherlands," "Lectures on Ancient History," and "History of Byzantium."

NIEHAUS (nē'hous), **Charles Henry,** sculptor, born in Cincinnati, Ohio, Jan. 24, 1855. After attending the public schools of his native city, he began the study of art at the McMicken School of Design and subsequently studied at Munich, Germany, where he was awarded first prize for his production entitled "Fleeting

Time." In 1881 he returned to America and spent a number of years in making statues, including those of William Allen, now in the capitol at Washington, and of Garfield, now in Cincinnati. Subsequently he spent a number of years in Rome studying the work of eminent artists and finally settled in New York City. In 1901 several of his productions were exhibited at the Pan-American Exposition in Buffalo, including two large groups representing "Mineral Wealth." Among his best known works are the statues of Hooker and Davenport in the State capitol of Connecticut, the monument of Lee at Richmond, the statues of Moses and Gibbon in the Congressional Library in Washington, and a production entitled "The Scraper."

NIELLO (nĭ-ĕl'lō), a substance used to fill up lines and patterns in executing ornamental work. It has a black color, melts at a moderate heat, and may be ground into a fine powder. Niello has been used in doing ornamental work from an early date. The best products made with niellos are Byzantine. Later the art was introduced into Russia, where it is still practiced to a considerable extent. Although used in Europe and America, it is less popular than enamel. Niello work is executed by cutting a design in metal and filling with the colored composition. After the object has been decorated, it is cleaned and polished, so a black pattern is shown on the smooth metal surface.

NIEMEN (nē'mĕn), or **Memel**, a river of Europe, having its source near the city of Minsk, Russia. After a course of 550 miles, it flows into the Baltic Sea, entering that body through Kurisches Haff. It divides near Tilsit and forms a large delta. The Niemen is navigable to Grodno, a distance of 400 miles from its mouth. It is connected with the Dnieper and Black Sea by the Oginski Canal. After entering Germany, it takes the name of Memel.

NIFLHEIM (nēfl'hīm), in northern mythology, the kingdom of cold and darkness, separated by a great chasm from Muspelheim, the kingdom of light and heat. It was one of the nine homes or abodes which the Scandinavians anciently thought were provided in the beginning of time. The region was ruled over by Hel. It was looked upon as the final abode of those who die of old age or in the state of wickedness.

NIGER (nī'jĕr), or **Joliba**, a great river of Western Africa, having its source north of the Kong Mountains. After a general course to the northeast as far as Timbuktu, it makes a bold curve and assumes a tortuous course toward the southeast, flowing into the Gulf of Guinea by an extensive delta. The natives apply various names to it in different regions, such as Mayo, Joliba, and Quorra. Its exact extent is not known definitely, the most careful estimates placing its length at 2,800 miles and its basin at 800,000 square miles. The region where it rises is mountainous, its source being fully 3,000 feet above sea level. After flowing about 325 miles, it reaches a region of great fertility. In many places near Timbuktu several channels are formed that surround extensive islands, and in some places the river spreads over a large flat region. It has few tributaries of importance, except the Benue, which rises in the upper part of French Congo, flows toward the southwest, and joins the Niger at Lokodza.

The delta of the Niger begins about one hundred miles from the sea, at Abo, and consists of three principal mouths known as the Nun, Mari, and Bonny. It extends fully 150 miles along the coast and includes a vast region of mangrove forests. The existence of the Niger was known to Herodotus, who supposed it to be a tributary of the Nile, and Pliny also spoke of it in that connection. The first definite knowledge of the river was secured in 1796, when Mungo Park explored its banks for a distance of 160 miles. A railroad line is projected from the head of navigation on the Senegal, at Kayes, to Timbuktu for the purpose of uniting the traffic of that river with the navigation of the Niger.

NIGERIA (nī-jē'rĭ-ȧ), or **Niger Territories**, a vast region of West Africa, belonging to Great Britain. It is situated between the British Lagos and the German Cameroon, and stretches north from the Gulf of Guinea for about 1,000 miles. This region includes Southern Nigeria and the territory formerly occupied by the Royal Niger Company, known as Northern Nigeria. Southern Nigeria became a British protectorate in 1884, and the Niger Territories passed from the Royal Niger Company to the British in 1899. The entire region embraces about 450,000 square miles. It includes a number of large interior towns and trade centers, among them Wari, Bonny, Akassa, and Kano. The trade is carried on largely by navigation on the Niger River, on which steamers may penetrate into the heart of the continent. Among the products are India rubber, hides, ivory, gum, vegetable butter, live stock, coffee, cocoa, and fruits. The imports embrace cotton, silk, and woolen goods, beads, hardware, earthenware, salt, and utensils. The Fulahs are the dominant race, though there are many different classes governed under a number of chiefs and native kings. Old Calabar is the seat of government in Southern Nigeria and Zungru is the capital of Northern Nigeria. Christian missionary societies are operating among the natives. A number of government schools receive public support. The population is estimated at 25,000,000.

NIGHT HAWK, a bird found widely distributed in North America, belonging to the family of goatsuckers. It is of value for its destruction of large insects and beetles, upon which it feeds. The common night hawk is about nine inches long, measures 22 inches in expanse of wings, and has a slightly forked tail. The color is brown with small spots of

white on the throat and sides. This bird pursues its prey in the air, principally near sunset. It often flies to a great height at twilight and suddenly rushes downward, when a sharp, rasping cry is heard. The *whip-poor-will* and *chuck-will's-widow* are species of the night hawk. These birds are migratory, leaving the northern zones in September and returning in May. In most species the flight is rapid.

NIGHT HERON, the name of a class of birds immediate in form between the herons and the bitterns, but distinguished from both by having a shorter and thicker bill. The legs are shorter than those of the herons. The *common night heron* of America ranges from the southern part of Canada to Mexico. It is timid, has a black bill and yellow feet, and builds a coarse nest in brush or on the limbs of trees. In some places it is called the *qua-bird* from the noise which it makes. It moves northward in the spring to nest in the woods near ponds and streams and returns southward in autumn. At night these birds are harassed by raccoons and other animals and by day they are pursued by crows, hawks, and vultures. Several species of the night heron are widely distributed in Africa, Asia, and Europe. The *yellow-crowned night heron* is native to South America.

NIGHTINGALE (nīt'ĭn-gāl), a bird of song, belonging to the thrush family. The plumage of both sexes is alike, being reddish-brown above and grayish-white beneath. In most species the tail is rufous and the breast

NIGHTINGALE.

is dark hued. It is so named because it chants its beautiful song at night, but only the male is the singer, and its song ceases at the time the female has hatched its young. The nightingale is distributed extensively in Eurasia and Africa. It is particularly abundant in the western part of Europe and the countries bordering on the Mediterranean. Its nest is built on or near the ground and from four to six olive-colored eggs are laid. It gathers food by searching for caterpillars, worms, ants' eggs, insects, and beetles. Among the best known species are the *true nightingale,* the *thrush nightingale,* and the *Indian nightingale.* The *redwing* is often mentioned as the Swedish nightingale and the *Virginia nightingale* is a species of grosbeak. In some countries the nightingales are prized as cage birds. They have entered extensively into the literature of many civilized nations. In captivity they are short lived.

NIGHTINGALE, Florence, noted nurse, born in Florence, Italy, May 12, 1820. She was the daughter of William Edward Nightingale, early manifested a desire to alleviate suffering, and in 1844 made a tour of Europe to inspect the condition of hospitals. In 1851 she began to study for the profession of a trained nurse at Kaiserswerth, Germany, where she performed with her own hands all that was then required of one intending to make nursing a science and profession. After completing a systematic course, she visited hospitals at Paris and took charge of a sanitarium in London, where she gave unremitting attention to the management of the institution. When the war between Russia and Turkey broke out, in 1854, she concluded to proceed to the scene of contest in the Crimea, where the sanitary needs of the soldiers were most neglected. With a company of thirty trained nurses she took charge of the military hospitals at a time when the English public was frantic over the mortality resulting from neglect of the soldiers.

FLORENCE NIGHTINGALE.

The larger work of Miss Nightingale began at Scutari in 1854 and the following spring she crossed the Black Sea to Balaklava, where she reorganized the camp hospital. After the close of the war, in 1856, she returned to London. Shortly after a fund of $200,000 was raised by public subscription with which the Nightingale Home was founded, of which she was given charge. At the time of the Civil War in America she rendered valuable service by corresponding with the medical and hospital departments at Washington. During the Franco-German War she was active in the army hospitals of both Germans and French. Miss Nightingale was regarded the greatest authority on the care of the sick in her time and was honored by many nations. Longfellow wrote "Santa Filomena" in her praise. Her writings

include "Notes on Nursing," "Notes on Hospitals," "Life or Death in India," and "A Note of Interrogation." She died Aug. 14, 1910.

NIGHTMARE, or **Incubus,** a state of oppression which is sometimes experienced during sleep, in which there is a sense of great pressure upon the breast accompanied by inability to move. It manifests itself in the form of uneasy or painful sensations, but they are insufficient to wake the patient, hence disagreeable or frightful dreams are apt to occur. Sometimes the persons afflicted suffer from illusions, appearing to be attacked by wild animals or armed men, or they seem to be falling down precipices. The more common form of nightmare usually takes place during the first sleep and is caused by a constrained position or by a distended stomach, which may act to somewhat impede respiration. The nightmare is caused by the feeling of oppression produced in this way and is dispelled at once when the patient awakes and draws a full breath. Those subject to a variety of chronic affections, such as dyspepsia or heart disease, are frequently affected by nightmare.

NIGHTSHADE (nīt'shād), a class of plants belonging to the natural order *Solanaceae,* commonly reputed poisonous and used extensively in medicines. They are weedlike plants with white flowers and black berries, and are widely distributed in all the continents and many islands. The common species include the *black nightshade;* the *deadly nightshade,* or *belladonna;* the *woody nightshade,* or *bittersweet;* and the *enchanter's nightshade,* or *circaea.* Several species of nightshade common to Europe are extremely poisonous, but those found in North America are not regarded as possessed of poisonous qualities, though the leaves and berries have properties that induce sleep. The *common nightshade* grows to a height of about two feet. It is much branched and has white flowers and ovate leaves.

NIHILIST (nī'hĭl-ĭst), a term applied to the advocates of *Nihilism* in Russia, which is a socialistic movement that began to form as early as 1860. It was first applied by Ivan Turgenieff (1818-1883) to the hero of his novel, "Fathers and Sons," who was made to personify a movement in Russia for the spread of greater religious and political independence. When a movement was inaugurated to free the serfs, in 1860, though this was prevented by serf owners influencing the Czar, the Nihilists began to conduct active educational movements. In harmony with the general plan, many young men and young women of the upper classes visited the fields and factories for the purpose of distributing socialistic literature and organizing societies. The object was to establish a party with vast influence in civic affairs through agitation. The rapidity with which the movement spread so alarmed the authorities that repressive measures were resorted to and several hundred of the advocates were tried and sentenced to exile in Siberia. By 1878 the movement began to grow with renewed strength as a direct resentment of the severity of punishment, and the acquisition of political freedom was declared the first necessity. Assassinations rapidly followed and incendiary movements became widespread.

In the month of June, 1879, 3,500 fires occurred in Saint Petersburg, most of them being attributed to Nihilists. The assassinations included those of Generals Drenteln and Mezentzoff, Commander Heyking, and Prince Krapotkin. In the meantime, on March 13, 1881, Alexander II. was assassinated near his palace by a bomb. When Alexander III. became Czar of Russia, it was hoped that great political rights would be extended to the people, including the formation of the legislative body, liberty to agitate reforms, and the adoption of a constitutional policy of government. Later the movement lost much of its vigor by the Czar encouraging industrial development, but recently Nihilism has again taken on new forms of life. Many Russians of wealth and high standing are favorable to the organization as a political party. Nihilism as now advocated favors greater political rights and agrarian socialism.

NIIGATA (nē-ē-gä'tà), a city of Japan, on the west coast of Hondo, at the mouth of the Shinano River. It has an open harbor and is connected with interior cities by railways. The site consists of a narrow strip of land between the river and the ocean, but it is well improved by paving and sewerage. Canals run through several parts of the city and the river is crossed by a number of bridges. Among the chief buildings are the post office, the central railway station, and many Buddhist temples. Muslin, clothing, and machinery are manufactured. The surrounding country produces coal, petroleum, tea, rice, and raw silk. In 1869 the port was opened to foreign trade, but the foreign commerce is not large. Population, 1922, 60,756.

NIJNI NOVGOROD (nĭj'nē nôv'gŏ-rŏt), or **Nizhni-Novgorod,** a city of east central Russia, capital of a government of the same name, on the Volga River, about 270 miles east of Moscow. It is well fortified, having a Kremlin with substantial walls. A large part of the city extends along the Oka River, which enters the Volga at this place. The chief buildings include the arsenal, the governor's palace, the city hall, the public library, and two fine cathedrals. It is the center of a large trade in cereals and lumber. Among the manufactures are machinery, leather, boots and shoes, cotton and woolen goods, spirituous liquors, tobacco, candles, and earthenware. The railroad commerce is extensive. Steamboat lines connect it by the Volga with the Caspian Sea and by canal with the Baltic. It is the seat of annual fairs, when many thousands attend. Population, 1922, 111,600.

NIKKO, a noted center of religious worship in Japan, situated about ninety miles northwest

of Tokio, where it has a fine site on the Nikko Zan, meaning mountains of the sun's brightness. A Buddhist temple was established there in 767 and subsequently many temples and other institutions were founded, though the place lost much of its splendor by a destructive fire in 1861. It is now celebrated more particularly because of the many splendid sepulchers in which lie the remains of noted personages, including several shoguns of Japan. Large caravans of pilgrims wend their way to Nikko annually to worship in the shrines of ancient splendor, or to look with feelings of satisfaction upon the statues of heroes whose achievements enter largely into the traditions and history of the Japanese.

NILE, the largest river of Africa, formed at Khartum by the junction of the Blue Nile and the White Nile. The latter, which is called the Bahr-el-Abiad by the natives, is regarded the main stream and has its source in Lake Victoria Nyanza. The length is 4,100 miles and the basin drained by it includes 1,425,000 square miles. It is the longest river, next to the combined Mississippi-Missouri, and its basin is one of the largest in the world. A considerable portion of the northern part of German East Africa is included in the basin, this region draining into Lake Victoria Nyanza. The White Nile issues from Lake Victoria Nyanza and forms the Ripon Falls, thence passes through Lake Ibrahim Pasha, and enters Lake Albert Nyanza. The Falls of Karuma and the Murchison Falls are situated in its course before reaching Lake Albert Nyanza, the latter being about 230 miles from Victoria Nyanza. From the latter lake it flows in a northerly direction to about 9° north latitude, where it receives the Bahr-el-Ghazel, and flows nearly east until it receives the Sobat River. There it again makes a bold curve and continues in a northerly course until it reaches Khartum. After receiving the Blue Nile, a river flowing from the southeast and having a length of 950 miles, it has a northeasterly course to Ad Damer, where it receives the Atbara from the southeast, its last tributary, and thence has a northerly but tortuous course until it reaches the Mediterranean Sea.

Numerous cataracts and obstructions to navigation characterize various portions of the Nile and below Khartum are six great rapids. Several of the cataracts have been overcome for navigation purposes by the construction of canals and by several deepenings of the channel. The delta of the Nile begins near Cairo, where two branches known as Rosetta and Damietta are formed, though there are a large number of smaller channels, the most easterly entering near the Suez Canal and the most westerly near the city of Alexandria. The Nile owes its vast water supply to the rains which fall in the tropical regions and form the extensive equatorial lakes. There is scarcely any rainfall in the greater part of the lower valley, and at certain seasons of the year evaporation reduces the water supply near its mouth to a smaller quantity than flows through its channel in the Nubian Desert. In June the water supply increases and its greatest volume is reached in September. The rise and subsidence are equally gradual, and during the height of the flood much of the valley of Lower Egypt and a great part of the delta are inundated, the rise at Cairo being about forty feet. These floods are of immeasurable value in stimulating plant growth in the Nile valley, since they bring great productiveness to the soil by watering and fertilizing it. Much of the valley would otherwise be barren.

Some writers divide the Nile into four sections, from the fact that it passes through regions having that number of distinctive aspects, the divisions being known as the Delta and the Lower, Middle, and Upper Nile. The Delta is a network of canals and streams. From the Delta to Assuan stretches the Lower Nile, which is navigable the entire distance by large vessels. The Middle Nile extends from Assuan to Khartum, a distance of 1,125 miles, and is characterized by the region of cataracts. At Assuan the First Cataract is 3 miles long with a drop of 16 feet. A distance of 214 miles up the river, near the town of Wadi-Halfa, is the Second Cataract, which is 124 miles long and falls 216 feet. The Third Cataract is 73 miles farther up the river, has a fall of 36 feet, and is 45 miles long. Between the Third and Fourth cataracts is the productive region of Dongola; the latter is 68 miles long and drops 160 feet. Twenty-eight miles north of Berber is the Fifth Cataract, with a descent of 200 feet in 100 miles, and the Sixth Cataract is about 50 miles below Khartum and drops 20 feet in one mile.

Attention has been attracted to the Nile in recent years particularly on account of the great reservoir at Assuan, work on which was commenced in 1899 and the reservoir was formally opened Dec. 10, 1902. Its construction consists principally of a dam of masonry across the first rapids north of the island of Philae. The dam averages 60 feet in height, with a maximum height of 130 feet, is 23 feet wide at the top, and the difference of water level below and above is 67 feet. There are 180 openings for sluices, which serve to direct the flow of the water as it is needed for irrigation. It is estimated that about 800,000 acres can be irrigated in an average year, which area includes 52,000 acres in the Fayum, 70,000 acres in Upper Egypt, 106,000 acres in the province of Ghizeh, 120,000 acres of cotton land in Lower Egypt, and 456,000 acres in Middle Egypt between Cairo and Assiut. The enterprise of building the Assuan dam is the greatest achievement of the kind on record and the network of irrigating canals constitutes the largest system ever constructed for irrigating purposes.

The Nile has long been held sacred by the

Egyptians, presumably because of its value in maintaining fertility, the god Nilus being one of their divinities. It was thought by many of the ancients that the Nile had its source in Morocco and passed underneath the ground as a subterranean stream until it reached a point in Nubia, but in the time of Nero explorations were made that indicated its source to be located far toward the south. The source of the Blue Nile was discovered in 1770 by Bruce, but much information gathered regarding the true Nile dates from 1858 and 1868, when Speke and Schweinfurth made their respective exploration tours. Livingstone operated from the south and in 1871 reached Lake Tanganyika, which was found to drain into the Zambezi. In 1875 Stanley published authentic information that the source of the Nile is in Victoria Nyanza, but that a considerable region south of that lake drains into it. The Nile abounds with fish, including the salmon, white trout, and several species of eels. Among the wild animals common to the region of the Upper Nile are the ibis, crocodile, and hippopotamus.

NILE, Battle of the, a celebrated engagement at the mouth of the Nile, in the Bay of Aboukir, about thirteen miles northeast of Alexandria, which was fought on Aug. 1, 1798. The English fleet was commanded by Nelson and the French by Admiral De Brueys, and the result was a decided victory to the former. Napoleon landed at the bay on July 25, 1799, and defeated the Turks under Mustapha. Sir Ralph Abercrombie effected a landing there in 1801.

NILES, a city of Ohio, in Trumbull County, on the Mahoning River, 58 miles southeast of Cleveland. It is on the Erie, the Baltimore and Ohio, and the Pennsylvania railroads. The chief buildings include the high school, the public library, and several churches. The surrounding country is farming and dairying, producing large quantities of cereals, live stock, and dairy products. Among the industries are boiler shops, rolling mills, and machine shops. Waterworks, electric lights, and sanitary sewerage are among the utilities. Niles was incorporated in 1864. Population, 1900, 7,468; in 1920, 13,080.

NILES, a city of Berrien County, Mich., on the St. Joseph River and on the Michigan Central and other railroads. Power is derived from the river for manufacturing. It has flour mills, machine shops, an electric plant, and paper mills. The place was settled in 1828 and incorporated in 1859. Population, 1920, 7,311.

NILSSON (nĭl'sŭn), **Christine,** operatic singer, born in Wexio, Sweden, Aug. 3, 1843. In 1864 she appeared successfully at Paris in Verdi's "Traviata," sang in London in 1867, and made an extensive tour of the United States in 1870 and 1871. She was married in 1872 to M. Rouzaud, who died in 1882. In 1887 she married the Spanish count, Casa de Miranda, and soon after retired from the stage. Her voice was remarkably beautiful. Wagner's "Lohengrin" was her favorite subject, in which she appeared as *Elsa.* She died Nov. 22, 1921.

NIMBUS (nĭm'bŭs), in art, the name of the disk or halo used to designate the divine or sacred personages. It is used extensively in sacred art among the Christians, in which the nimbus surrounds the head of Christ, the Virgin Mary, and other persons to which important functions attach. Though the use of the nimbus originated among the Christians in the 5th century, it is employed to some extent in the classic art and among the Hindus. At first it was used only to designate Christ, especially when He was represented in a group of persons. Later the head of Christ was enriched by a circular nimbus, while the Father was designated by a triangular shape, and the Holy Ghost came to be represented by a dove with a circular nimbus. The Virgin Mary was in many cases crowned by a circlet of small stars and the angels and saints were designated by a circle of small rays. Many frescoes, illuminated manuscripts, and mosaic paintings show a wide use of the nimbus in sacred art.

NIMEGUEN (nĭm'ę-gĕn), a city of the Netherlands, in the province of Gelderland, four miles from the border of Germany. It is located on the Waal River, has a somewhat hilly and elevated site, and is surrounded by a fertile farming and fruit-growing country. The streets are steep and narrow, but many are paved with brick and stone. Steam and electric railways furnish communication with the leading cities of Western Europe. It has the church of Saint Stephen, a fine Gothic structure, and contains a museum, a townhall, and several parks. The manufactures include flour, leather, furniture, cigars, wine, perfumery, and Weissbier. It has a large trade in merchandise, cattle, and agricultural products. The Treaty of Nimeguen was concluded here in 1678, which terminated the war between France and Holland. A second treaty was concluded in 1679, between France and the German Empire. Formerly it was one of the best garrisoned and fortified of Europe and it still has strong fortifications. Population, 1919, 55,828.

NIMES (nēm), or **Nismes,** a city in the southern part of France, capital of the department of Gard. It is situated conveniently in a fertile region and on several railroads. The streets are largely tortuous in the older part, but the newer portion is finely improved and has many imposing buildings. Among the manufactures are cotton textiles, silk and woolen goods, carpets, upholstery, boots and shoes, leather, clothing, and machinery. Productive coal fields are worked in its vicinity. It is noted as a market for cocoons, silks, brandy, wine, and cereals. The city was founded by the Greeks, but later became a possession of the Romans, who built a number of great institutions that are still evidenced by many remains, among them baths, a mausoleum, and an amphi-

theater with a capacity for 20,000 persons. The Gauls expelled the Romans and made it one of their most important commercial centers. It belonged to various sovereigns until 1252, when it became a part of France. Nîmes was a stronghold of Calvinism in the 6th century, but after the revocation of the Edict of Nantes it began to decline rapidly. After the Revolution its industries were reëstablished and it has since grown rapidly. Population, 1922, 80,184.

NIMROD, the founder of Babylonia. He is described in Gen. x., 8-12, as a son of Cush and the grandson of Ham, and as "a mighty hunter before the Lord." The name is not found in the cuneiform writings, but it is thought that he is identical with the hero described in the epic known as the "Izdubar."

NIMRUD, or Nimroud, the name applied to a mound on the east side of the Tigris, seven miles above the mouth of the Great Zab and twenty miles southeast of Mosul. It is on the site of the ancient city of Calah, built by Shalmaneser I. about 1320 B. C. This city was located about twenty miles south of Nineveh and was the third capital of Assyria, succeeding in this respect Asshur and Nineveh. The ruins are thought to be the remains of structures built by the kings, probably their palaces and several great temples.

NINEVEH (nĭn'ĕ-vę), an ancient city of Asia, celebrated as the capital of the Assyrian Empire. It was situated on the east side of the Tigris River, opposite the present town of Mosul. Nimrod, a descendant of Ham, is mentioned in the Scriptures as the founder of Nineveh. On many of its monuments it is called Nina, being so named from Ninus, a name sometimes applied to Nimrod. Most of our knowledge of this city comes from classical writers, some of whom have described it as occupying an extensive site along the river and as having a circumference of 60 miles. It was inclosed by walls 100 feet high. Among its structures were 1,500 towers 200 feet high. The wall surrounding it was finished in such a manner that three chariots abreast could be driven upon it with convenience. The Book of Jonah mentions it as an "exceeding great city of three days' journey." It remained the capital of Assyria until the fall of that empire, about 625 B. C., when it was destroyed by the allied armies of the Babylonians under Nabopalassar and the Medes under Cyaxares.

The Grecian historian, Herodotus, visited the vicinity of Nineveh about 430 B. C. He found the great Assyrian city desolate and in ruins, but from his writings we learn much of its extent, location, and former greatness. In 1841 explorations and excavations were begun by Bernhard Cotta (1808-1879), who brought to light a number of monuments and libraries, and in 1845 Sir Henry Layard made a careful investigation of its site and many of its ruins. About that time the palaces of Sennacherib, Esarhaddon, and Assurbanipal were uncovered, and its history was unfolded at least partly by the discovery of additional libraries and many cuneiform inscriptions. Vast explorations have since been carried on under the auspices of European and American archaeological societies, and many relics of great historical value are now deposited in the museums of New York, London, Berlin, Paris, and other cities. It is reasonably certain that Nineveh was not only the center of Assyrian art and culture, but that it was one of many great cities. Its monuments and remains still traceable give conclusive evidence that the city had not only strong military structures, but fine educational institutions, palaces, temples, and gardens. It appears to have been a center of manufacturing and an extensive trade.

NINGPO (nĭng-pō'), a city of eastern China, in the province of Che-Kiang, on the Ningpo River, about fifteen miles from the Eastern Sea. A wall 25 feet high and 15 feet wide surrounds the city, through which entrance is effected by six gates. It was thrown open to foreign commerce in 1842, since which time it has developed a large trade. The manufactures include furniture, cotton and silk goods, straw hats, white-wood carvings, carpets, and toys. It contains a number of substantial government buildings, has well-paved streets, and gives evidence of great wealth and luxury. Its temples are among the most excellent in China and it contains the celebrated Ningpo Pagoda, a seven-storied hexagonal tower 160 feet high. Population, 1922, 257,500.

NIOBE (nī'ō-bē), a personage mentioned in

NIOBE.

Greek mythology as the daughter of Tantalus and the wife of Amphion, King of Thebes. It

is said that her pride caused her to incur the displeasure of Apollo. The story relates that Niobe was the proud mother of six sons and six daughters, and that she took pride in speaking of the number of her children. On one occasion she ridiculed the worship of Leto because she had but one son and one daughter, and accordingly wanted the Thebans to give her the honors and sacrifices formerly offered to Leto, the mother of Apollo and Artemis. These two deities became displeased. Accordingly Artemis slew all her daughters and Apollo all her sons, the last one being the youngest and best beloved, whom Niobe clasped in her arms and implored the enraged deities to spare her life, but the deadly arrow also reached the heart of this child. The unhappy father destroyed himself, while Niobe sat broken-hearted among her dead, shedding tears, and was transformed by the gods into a stone, which still continues to shed tears. The punishment of Niobe forms the subject of a magnificent marble group found in 1553, which is now in the gallery at Florence.

NIPIGON (nĭp'ĭ-gŏn), or **Nepigon,** a lake of Canada, in Ontario, 28 miles north of Lake Superior, with which it is connected by the Nipigon River. The length is 62 miles and the breadth from 15 to 40 miles. It has a number of bays and islands. In several places are rocky headlands. The region has fine forests. Valuable fisheries are found in the lake.

NIPISSING (nĭp'ĭs-sĭng), a lake of Canada, in the northern part of Ontario, so named from a tribe of Algonquin Indians. It is about 30 miles northeast of Georgian Bay, into which the overflow is drained by the French River. The lake is about 54 miles long and 25 miles wide, and with it are connected a chain of smaller lakes. Into it flows the Sturgeon River. A number of small islands are located in the lake, which is a popular resort for angling and shooting.

NIPPON (nĭp-pŏn'), or **Niphon.** See **Japan.**

NIPPUR (nĭp-pōōr'), a city of ancient Babylonia, located between the Tigris and the Euphrates, about fifty miles southeast of Babylon. It was famous as the seat of worship of the god Bel. Many ruins of antiquity have been found on its site. In 1888 the University of Pennsylvania began to make explorations at this place, by which means a large number of tablets were found. More recently a considerable portion of the site of several temples has been laid bare. It is thought that Calneh, mentioned in the Talmud, is identified with Nippur. Nuffar, a small village, occupies the site at present.

NIRVANA (nĕr-vä'nȧ). See **Buddhism.**

NISAN (nī'săn), the first month of the sacred year in the Jewish calendar, and the seventh month of the civil year. It corresponds nearly to the month of March in the Gregorian calendar. Originally it was called Abib, but after the Babylonian captivity the name was changed to Nisan.

NISH (nĕsh), or **Nissa,** a city of Servia, on the Nishava River, about thirty miles southeast of Belgrade. It is strongly fortified, has railway facilities, and is important as a strategic and commercial center. The streets are broad and improved with paving, and the city is divided into Turkish and European quarters. It has a gymnasium, waterworks, and several schools. Population, 1922, 23,600.

NITER. See **Saltpeter.**

NITRATE (nī'trāt), a salt formed by combining nitric acid with bases. Some of the nitrates are natural products, as the nitrates of lime, soda, potash, and magnesia, while others are formed artificially, as the nitrates of the oxides of metals. Small quantities of the natural products are widely distributed in nearly all the soils, but in some places are vast deposits, as the so-called Chile saltpeter beds of Chile and Peru. These deposits occur near the coast and are due to the remains of bird and marine animals. They are worked extensively to obtain fertilizing for the soil cultivated in farming and gardening, the value to the crops being due to the fact that plants require considerable nitrogen. A fertilizer serves its purpose best in a heavy soil, in which it is held until coming in contact with the roots, while rains incline to wash the fertilizer too deep into porous or sandy soils. Many of the nitrates are useful in medicine and the trades, such as those of lead and iron, used in medicine, and those of barium and strontium, useful in the manufacture of fireworks.

NITRIC ACID (nī'trĭk), a compound formed by oxygen with nitrogen, the most important of the five formed from these two elements. Nitric acid is a colorless liquid. It is partially decomposed by the prolonged action of light and is very volatile. The vapor of nitric acid condenses the moisture in the air, producing white fumes. It is very corrosive, staining the skin yellow, is disagreeable to the smell, and attacks many of the metals with great energy. It freezes at 40° below zero and boils at 184°, and while boiling is partially decomposed so that the boiling point rises about one-third higher. When the hydrogen of nitric acid is replaced by metal, nitrates are formed. The nitric acid and the nitrates of commerce are manufactured from nitrates which are found in some soils, particularly in Chile, Egypt, and India, the deposits of Chile embracing an abundance of sodium nitrate. Gun cotton is manufactured by adding nitric acid to cotton. It is used extensively as a powerful oxidizer of metals, such as silver, copper, tin, and many others, the oxidization taking place at the expense of the acid. It is employed in medicine in various forms as a tonic, for the removal of ulcers and warts, as a vapor to destroy contagion, and for affection of the liver. In the arts it is used for etching on copper or steel, in as-

saying and metallurgy, and in the preparation of dyes by forming a mordant of it and tin.

NITROBENZOL (nī-trō-bĕn′zōl), or **Nitrobenzine,** a heavy yellow liquid obtained by treating benzene with strong nitric acid. When the two liquids are mixed, they become warm and soon emit red fumes. At first the mixture assumes a brown color, but finally turns to an orange yellow. The flavor resembles that of bitter almonds, hence it is employed to a considerable extent instead of almond oil in the manufacture of soap and confectionery. However, its chief importance in commerce is due to the fact that it is converted into aniline by reducing agents.

NITROGEN (nī′trō-jĕn), a chemical element forming by volume 79 per cent. and by weight 77 per cent. of our atmosphere. It is a tasteless, odorless, and colorless elementary gas. Nitrogen is a common constituent of plant tissue and enters into the various tissues of the body of animals, although pure nitrogen is incapable of sustaining combustion or animal existence, but it possesses no positively poisonous properties. The characteristic properties are negative, serving mainly to dilute and moderate the activity of the oxygen, with which it is associated in atmospheric air. The existence of nitrogen in the atmosphere was discovered by Rutherford in 1772. It was long regarded permanent or incondensible, but Cailletet liquefied it in 1877 by reducing it to a very low temperature and applying a vast pressure. Nitrogen is considerably lighter than oxygen, hence a given bulk of nitrogen is lighter than an equal bulk of atmospheric air. However, air is not a compound, but a mixture, and hundreds of analyses have demonstrated that the proportions of the constituents are nearly constant, the proportion of nitrogen in one hundred volumes of unconfined air varying only from 79 to 79.14 per cent. While four-fifths of the volume of the atmosphere consists of nitrogen, niter contains only 13 per cent., nitric acid about 22 per cent. by weight, and water at ordinary temperature only 1½ per cent.

The exact economic value of nitrogen in the atmosphere is still largely unknown, since it is not susceptible of being taken up directly by plants and utilized in their synthesis of nitrogenous compounds, and it takes no active part in the processes of combustion and of animal respiration. It is thought that atmospheric nitrogen contributes indirectly to the formation of nitrogenous organic matter and that it promotes further utility by diluting the oxygen, it being impossible for animal life to subsist for any considerable length of time in pure oxygen, and no substitute for nitrogen to supply this necessary function is known. Animals secure the necessary supply of nitrogen by breathing atmospheric air. Plants are thought to obtain a portion of their supply from compounds existing in the soil and a part by aërial absorption through the leaves. The important compounds of nitrogen are five in number, including ammonia, nitrates, cyanides, nitro-compounds, and organic nitrogen compounds.

NITROGLYCERIN (nī-trō-glĭs′ĕr-ĭn), a light yellow, oily liquid used as an explosive, formed by combining concentrated nitric acid and sulphuric acid with glycerin at a low temperature. It was discovered by A. Sobrero, an Italian chemist, in 1847, and was at first used by itself, but the danger of its explosion by percussion led to the introduction of that class of dynamite compounds in which nitroglycerin is combined with a dope or infusorial earth. If poured in the liquid form into water equaling about fifteen times its bulk, the heavy nitroglycerin sinks to the bottom. When struck violently, it explodes with great force. The energy of the explosion is due to the energy of motion of the atoms in a molecule of nitroglycerin, the explosion resulting directly from the nitroglycerin being resolved into carbon dioxide, water, and nitrogen. An explosion may be effected by heating the nitroglycerin to about 500° Fahr., when in a liquid state, but the most convenient way is to apply a red-hot iron or an electric spark.

The explosive force of nitroglycerin varies according to the degree of purity, but in a pure form it is about thirteen times more powerful than an equal volume of gunpowder, and the gases produced equal about 10,000 times the bulk of the nitroglycerin used. When mixed with dope, it is made into cartridges, which are exploded by a fuse and detonating cap. In the latter form it is known by various names, according to the constituency of the compound, the common forms being fulminating oil, nitroglycerol, glonoin, glyceryl nitrate, nitroleum, blasting compound, trinitrin, and trinitro-glycerin. Nitroglycerin is used in various compounds for medicine, particularly in treating diseases of the digestive organs and the heart.

NIX, or **Nixie,** in mythology, the common name for the water spirits, both male and female, among the German races. They are represented as capable of assuming the human form, although able to take any other shape at will. Like the Greek sirens and muses, they loved music and the dance and had the gift of playing on stringed instruments. Young people often consulted the nixies to determine their future, inducing them to be good to mortals by promising gifts of different kinds. Though mild in appearance, they were frequently cruel and dangerous.

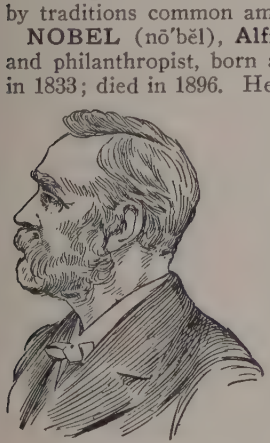
NIXON, Lewis, naval architect, born at Leesburg, Va., April 7, 1861. He studied in the United States Naval Academy, where he graduated in 1882, and subsequently took a special course in shipbuilding in the Royal Naval College, Greenwich, England. In 1884 he was appointed naval constructor in the United States navy, on account of which he inspected the most

important navy yards of Europe. In 1890 he designed a number of battleships and superintended their construction. He became proprietor of the Crescent Shipyard at Elizabeth, N. J., in 1895, and was made president of the United States Shipbuilding Company, New York City. Many large vessels and a number of battleships of the *Indiana* class were constructed under his supervision.

NIZHNI-NOVGOROD. See **Nijni Novgorod.**

NOAH, a patriarch mentioned in the Book of Genesis, son of Lamech. He was chosen by God for his righteousness and godliness to become the father of the generations who should people the earth after the deluge. God informed him that the deluge would sweep all animal life to destruction on account of man's wickedness, and instructed him to build an ark in which his family and animals of all species should be saved. Accordingly Noah built the ark and while doing so preached the duty of repentance to his erring neighbors, and, when it was completed, his family and a pair of all kinds of animals entered for protection during the flood. All living beings not protected in the ark were destroyed, and, after the waters subsided, the ark landed safely on Mount Ararat in Armenia. Noah and all beings in the ark were safely preserved. After the deluge he offered thanks to God, who gave a covenant that a deluge should never again destroy the earth, and the rainbow was given as the sign of the covenant. Noah died 350 years after the flood, being at that time 950 years old. The account of the deluge as recorded in the Bible is evidenced by traditions common among other nations.

NOBEL (nō'bĕl), **Alfred Bernard,** inventor and philanthropist, born at Stockholm, Sweden, in 1833; died in 1896. He was educated in Saint Petersburg, Russia, and later studied mechanical engineering in the United States. For some time he was a student under John Ericsson. In 1863 he obtained a patent for an explosive composed of gunpowder and nitroglycerin. He invented dynamite in 1867, his product consisting of three parts of nitroglycerin and one part of kieselguhr, a pulverized silicious material obtained in Germany. His inventions include a total of 129, of which dynamite, smokeless powder, and artificial gutta-percha are the most important. The later part of his life was spent near Nice, Italy, where he conducted experiments in a great laboratory.



ALFRED BERNARD NOBEL.

He is the founder of the famous Nobel prize fund of $9,200,000, the annual interest of which is divided into five equal parts and given as rewards to deserving persons. The five awards provided for include the most important invention or discovery in chemistry, in physiology, or in medicine; the most remarkable literary work of an idealistic nature; and the most important work in the interest of universal peace. The academies of Sweden award the first four prizes and the fifth is awarded by the Storthing of Norway. The first awards were made in 1901. Wilhelm Roentgen, of Germany, received the award in physics as the discoverer of the X-rays; J. H. Van Hoff, of Germany, was given the award in chemistry for founding a new system of stero-chemistry; Emil Behring, of Germany, received the award in physiology and medicine as the discoverer of antitoxin for diphtheria; Armand Sully-Prudhomme, of France, received the literary prize as author of "Justice"; and the peace award was divided between Henri Dunant and Frederic Passy. Including 1927, a total of 32 awards were made in physics, 23 in chemistry, 24 in medicine, 26 in literature, and 31 in peace.

NOBILITY (nō-bĭl'ĭ-tў), a class of persons elevated by hereditary rank in the state of society above the mass of the citizens. This institution originated at an early period in history, but the origin differs somewhat among the nations. The earliest nobility seems to have been religious in character, such as the Brahmins of India and the priestly class in Rome. Among the ancient Germans, Normans, and Swedes the nobility consisted of members of the royal family, who were supposed to be descended from Odin and other deities. The present nobility of Germany and Scandinavia dates from the Middle Ages and was founded chiefly through military supremacy. This is true to a large extent of the nobility in all European countries, but the possession of property played a prominent part in establishing and maintaining titles. This is attested by the prefixes *de* and *von* in Germany and their equivalent in other countries. The nobles are still looked upon as the criterion of gentility or nobility, but many exceptions are found in England, where a number of aristocratic families rose to prominence from other consideration rather than from the possession of territory or wealth. The Spanish term *hidalgo,* meaning the son of somebody, implies nobility. This term entitles a gentleman to be called *don,* which is used with the Christian name like *sir* in addressing the British baronets and knights.

In Great Britain the nobility consists of the five ranks of duke, marquis, earl, viscount, and baron. Baronets, knights, and the younger sons of peers are classed among the gentry, but on the continent they are looked upon as nobles. In general all members of families in Europe entitled to bear coats of arms are classed with the nobility. The British nobility consists of

the five ranks mentioned, but in a still more restricted sense it is confined to the members of the upper house of Parliament.

NOBLE, Alfred, civil engineer, born at Livonia, Mich., Aug. 7, 1844. He volunteered for service in the Federal army in 1862, served in the Army of the Potomac until 1865, and later graduated at the University of Michigan. He was made a member of the Nicaraguan Canal Board in 1895, and two years later was appointed to survey the route of a ship canal from the Atlantic to the Great Lakes. Later he was commissioner on the Isthmian canal.

NOBLESVILLE, county seat of Hamilton County, Ind., 22 miles northeast of Indianapolis, on the White River and on the Lake Erie and Western and other railroads. It has flour mills, carbon works, strawboard factories, and grain elevators. The features include electric lights and railways, paving, high school, city hall, and courthouse. It was settled in 1820 and incorporated in 1853. Population, 1920, 4,758.

NODE, a term used in mathematics to designate a point where a curve cuts itself, through which more than one tangent to the curve can be drawn. The term is used in astronomy to indicate either of the two points at which the intersection of the planes of two orbits pierce the celestial sphere, especially those of a satellite and its primary. The node encountered by a heavenly body in its northward passage is called its *ascending node* and in its southward passage it is termed the *descending node.* A straight line joining the nodes is termed the *line of the nodes.* The sun is in its ascending node at the vernal equinox and in its descending node at the autumnal equinox. The points at which the orbit of the moon cuts the ecliptic are known as the *lunar nodes.*

NOGI (nō'gĭ), **Ki-teu,** soldier and public man, born in Japan in 1851. He descended from a family belonging to the Samurai cast and had the advantage of extensive literary and military training. In 1895 he served with distinction in the Japanese-Chinese War and, after the conclusion of peace, was made governor of the island of Formosa. In 1904 he became commander of the third army to invade Manchuria during the Russo-Japanese War and was directed to operate against Port Arthur. The fortress was besieged from September until Jan. 1, 1905, when it surrendered to General Nogi. Subsequently he operated with General Oyama at Mukden. Sept. 13, 1912, because of the death of Emperor Mutsuhito, he committed suicide.

KI-TEU NOGI.

NOME, a city of Alaska, on the shore of Bering Sea, near Cape Nome. It is situated about 150 miles southeast of Cape Prince of Wales and eighty miles from Golofnin Bay. The shore is bordered by low tundra and marshland, and between it and the sea is a low sandy beach. In 1900 gold was discovered near the city of Nome, causing many gold seekers to locate there for the summer, and before the end of the year $18,000,000 worth of gold was found. The region has since been productive of the precious metal, causing a rapid increase in the population of the northern district of Alaska. However, the climate is very severe and the ground is frozen nearly the entire year. Among the noteworthy buildings are the courthouse, the post office, the city hall, and several public schools. It has waterworks, sanitary sewerage, electric lighting, and a police department. Population, 1900, 12,488; in 1920, 2,800.

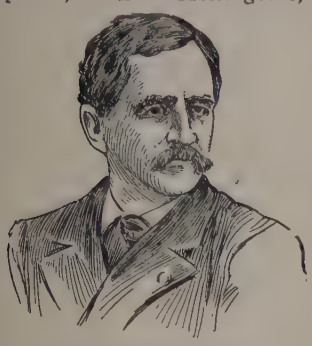
NONCONFORMISTS (nŏn-kŏn-fôrm'ĭsts), or **Dissenters,** the name applied to the British subjects who dissented from the Anglican Church. This class had its beginning at the time of the Restoration, when a large number of clergymen refused to assent to the Act of Uniformity, in consequence of which they were rejected from their livings. In 1689 the Toleration Act was passed to relax the penal statutes, after which the Nonconformists acquired protection of their funds and capital, but the policy of the government was not liberal toward them. The civil disabilities to which the Nonconformists were subject for more than two centuries were removed by repealing the Corporation and Test acts in 1828. In 1836 the Dissenters were permitted to be married by their own ministers and were granted other relief. Other disabilities were removed in 1871, when the great universities were opened to their young men, and in 1880 the passage of the Burials Act permitted their ministers access to churchyards for funerals. The Nonconformists constitute an aggressive class in public affairs and, when acting in harmony, may exercise a wide influence in government.

NONES, the ninth day before the ides in the Roman calendar, both the particular day and the ide being included. The ides occur on the fifth day of all the months, except March, May, July, and October, in which they occur on the seventh day.

NORDAU (nôr'dou), **Max Simon,** physician and author, born in Budapest, Hungary, July 29, 1849. He descended from Jewish parents and studied medicine in Budapest, where he entered upon the practice of medicine in 1873. In 1878 he made an extended tour of Europe, visiting Paris and other large cities, and soon after became a contributor to various periodicals. Subsequently he published several criticisms on lit-

erature, civics, and sociology, and in 1885 wrote his celebrated "Paradoxes," a philosophical study which was widely translated. Subsequently his well-known work entitled "Degeneration" appeared, which was translated soon after into English. It is devoted to an investigation of the degeneration from intellectual activity and excitement of the half century ending in 1885, which he alleges brought on the emotional sentimentality and impurity manifest in many quarters of society. He died Jan. 22, 1923.

NORDENSKJÖLD (nạ-rẹn-shēl'), **Nils Adolf Erik, Baron,** Swedish naturalist and explorer, born in Helsingfors, Finland, Nov. 18, 1832; died Aug. 12, 1901. He studied in Borgo, took a course in the University of Helsingfors, and later entered the University of Berlin. During vacations he studied the natural history of Finland. Later he settled in Sweden, whence he accompanied Torell on his Arctic expedition to Spitzbergen, and subsequently made several other voyages to the polar sea. In 1869 he explored the region from the Kara Sea to the Yenisei, in Siberia, and soon after turned his attention to finding a northwest passage to the Pacific from the Atlantic. In this enterprise he was aided by the King of Sweden and others. Sailing in the *Vega* in July, 1878, he doubled Cape Tchelyuskin, the northern point of Eurasia, and on Sept. 2, 1879, reached Japan by way of Bering Strait. The King of Sweden created him a baron in recognition of his services, and he was likewise substantially honored by Germany and other countries. He wrote "Voyage of the Vega Around Asia and Europe."



NILS NORDENSKJÖLD.

NORDHOFF (nôrd'hŏf), **Charles,** journalist, born in Erwitte, Germany, Aug. 31, 1830; died July 14, 1901. He accompanied his parents to the United States in 1835 and attended Woodward College, in Cincinnati. Later he learned the trade of a printer and for nine years served in the United States navy. In 1853 he entered a newspaper office in Philadelphia, afterward removed to Indianapolis, and in 1861 joined the editorial staff of the New York *Evening Post.* He remained with the last mentioned newspaper until 1871, when he traveled in California and the Hawaiian Islands. In 1873 he located at Washington, D. C., as correspondent of the New York *Herald.* His writings deal with travel, politics, and philosophy. They include "Man-of-War Life," "Whaling and Fishing," "America for the Workingmen," "Secession is Rebellion," "Politics for Young Americans," "God and the Future Life," and "The Communistic Societies of the United States."

NORDICA (nôr'dĭ-kà), **Lillian,** eminent singer, born in Farmington, Me., in 1859. Her maiden name was Lillian B. Norton. In 1882 she married Frederick A. Gower, who is supposed to have been killed in a balloon accident, and in 1896 was married at Indianapolis, Ind., to Zoltan F. Döhme. She received musical training at the Boston Conservatory of Music and began singing in public in 1876, and three years later accompanied Gilmore's band to Europe, where she studied operatic singing. Subsequently she toured Russia and Germany, and appeared successfully in Paris and London. In 1895 she sang at the Metropolitan Opera House, New York City, and subsequently appeared in many cities of the United States, being accompanied by her second husband. Her greatest successes were in singing soprano parts of Wagner's operas. She died May 10, 1914.

NORFOLK (nôr'fạk), a city of Virginia, in Norfolk County, ninety miles southeast of Richmond, on the Elizabeth River, an inlet from Chesapeake Bay, opposite Portsmouth. It is the converging center of several railways, including the Norfolk and Western, the Southern, the Seaboard Air Line, the Atlantic Coast Line, and the Norfolk and Southern. Inland water communication is provided by the Albemarle and Chesapeake and the Dismal Swamp canals. Transcontinental and coastwise steamboat lines visit it regularly. The harbor is safe and commodious, connecting with the James River and Hampton Roads. It is the principal port city of Virginia, the second largest city in the State, and is the leading peanut market of the world. The site is quite level, but sufficiently elevated to be healthful, and the area is four square miles. Many of the streets are paved with brick and stone and all are well drained and graded. An efficient system of street railways supplies communication with Portsmouth, Cape Henry, Virginia Beach, Ocean View, and other points of interest. The city has waterworks, gas and electric lighting, and extensive telephone facilities.

The principal buildings include the customhouse, the post office, and the city hall. Saint Paul's Church dates from 1737 and is one of the oldest buildings in the city. It is the seat of the Norfolk Academy and the Norfolk Mission College for colored students. The public schools are well systematized and attended. The Royster Building, the Citizens' Bank, the Monticello Hotel, and the Saint Vincent's Hospital are modern architectural structures. At Portsmouth, across the Elizabeth River, is the Norfolk Navy Yard. Across Hampton Roads, a short distance northwest, are Newport News and Fortress Monroe, with which it is connected by lines of ferries. The public library has about 25,500 volumes.

Norfolk has a large domestic and foreign trade in lumber, cotton, coal, peanuts, grain, oysters, and fruits. In its vicinity are many large gardens and dairy farms, the products of which are transported to the larger cities. It ranks as one of the principal coaling stations in the world. Among the manufactures are lumber, fertilizers, cotton and silk goods, machinery, tobacco and cigars, boots and shoes, and sailing vessels. The town of Norfolk was organized in 1682, was incorporated as a borough in 1736, and became a city in 1845. The British bombarded it in 1776, when most of the buildings were destroyed. It was the chief naval station of the Confederate States until 1862, when it was captured by the Federal forces. The battle between the *Monitor* and the *Virginia* was fought near the city. In 1907 it was the seat of the Jamestown Ter-Centennial Exposition. Population, 1920, 115,777.

NORFOLK ISLAND, an island in the South Pacific, about half way between New Caledonia and New Zealand and 1,200 miles northeast of Sydney. It has an area of sixteen square miles. The coasts are steep and high, but the soil is fertile and the climate is healthful. Mount Pitt, the highest elevation, has a height of 1,040 feet above sea level. Wheat, maize, sweet potatoes, cabbage, and tropical fruits are the principal products. Formerly it yielded large quantities of pine, but the supply is almost exhausted. The government is administered by the state of New South Wales. Captain Cook discovered the island in 1774. It was used as a penal station until 1851. Population, 1922, 878.

NORFOLK ISLAND PINE, a tree of the pine family, native to Norfolk Island, where it was formerly the principal forest tree. It belongs to the genus *Araucaria.* The wood is white and tough and is valuable for furniture and construction purposes. The tree attains a height of about 200 feet. Many of the larger specimens have a diameter of ten or twelve feet.

NORMAL SCHOOL, an institution designed for training students to become teachers, in which the theory and practice of the teachers' profession is taught. The first normal schools were established in Germany, from which other European nations patterned, and institutions of this kind are now supported in every civilized country. The normal schools of the United States are modeled largely after those established in Massachusetts under the direction of Horace Mann. All the states now maintain one or more normal schools. In Canada and the United States, as a further means of instructing those who wish to teach, normal training has been provided in many of the high schools and in teachers' institutes (q. v.), though the latter are designed more particularly for inspirational purposes. The normal school system is so efficiently organized that teachers with normal training are given preference in many localities when positions are to be filled. The preparatory work is graded from the kindergarten branches to the courses of high schools and normal colleges. At present the attendance upon the normal schools of the United States is about 51,500, of which about one-fourth are male students. The age of those in attendance is generally between seventeen and twenty years. Besides public normal schools, there are a large number of private schools and academies in which normal training is given.

NORMANDY (nôr'mạn-dĭ), the name of a former province of France, bordering on the English Channel, comprising an area of 10,534 square miles. It is now divided into the five departments of Calvados, Eure, La Manche, Orne, and Seine-Inférieure. This territory formed a part of the Roman Empire, but it was seized by the Franks and united to Neustria. In the time of Charles the Simple, in 911, it became known as Normandy. William II. conquered England in 1066, when the two countries became united, and they continued a formal union until 1204, when Philip Augustus took possession of the province and made it a part of France. The English came into possession of it a second time after the Battle of Agincourt, in 1415, but it was reunited with France by Charles VIII. in 1449. Formerly the Channel Islands were a part of Normandy, but they have remained an English possession.

NORMAN FRENCH, a dialect spoken by the people of Normandy, after that region was occupied by the Normans or Northmen. When the Normans conquered England, in 1066, this dialect was made the language of England, where it is known as the Old French. It was the official speech until the time of Edward III., when it was replaced by the English, but in several formal proceedings of state it is still used.

NORMANS, the name applied to the descendants of the Northmen. The Normans came from Scandinavia and founded colonies in Gaul at an early date in the history of Western Europe. They settled chiefly in northern France, where they gave name to the ancient province of Normandy, which is now formed into the departments of Calvados, Eure, La Manche, Orne, and Seine-Inférieure. This region passed from the Romans to the Franks. In the 10th century it was conquered by the Normans, and their chief, Rollo, assumed the title of Duke of Normandy. Later they conquered England, which they annexed to Normandy in 1066, and, after becoming separated, Normandy was conquered by the French in 1203. Other settlements made by the Normans were in Italy and Sicily, where Norman princes ruled in the 11th and 12th centuries.

NORNS, the three fates of Scandinavian mythology, representing the past, the present, and the future. The Norns are represented in literature as three maids, who decree irrevocably

the destinies of man. They are named respectively Urd, Verdandi, and Skuld.

NORRIS (nŏr'rĭs), **Frank,** novelist, born in Chicago, Ill., in 1870; died Oct. 25, 1902. He was educated in the public schools of San Francisco, the University of California, and Harvard University. From 1887 until 1889 he studied art in Paris. His first publication, entitled "Yberville," is a story of Spanish life in the early settlement of California. At the time of the Jamison Raid he was correspondent from South Africa for the San Francisco *Chronicle* and in 1896-97 edited the San Francisco *Wave.* He was war correspondent in Cuba in 1898 for *McClure's Magazine* and in 1899 published his first novel, a realistic story entitled "McTeague." "The Pit" treats of the contest over the exchange of wheat, and "The Octopus" embodies an account of growing wheat and deals with the oppressive rates charged in transporting that product by railways from points in California. Other writings that attained considerable popularity include "Moran of the Lady Letty," "Epic of the Wheat," and "A Man's Woman."

NORRISTOWN (nŏr'rĭs-toun), a city of Pennsylvania, county seat of Montgomery County, on the Schuylkill River, sixteen miles northwest of Philadelphia. It is on the Pennsylvania and the Philadelphia and Reading railroads. In its vicinity are productive iron mines and quarries of marble, sandstone, and limestone. Among the noteworthy buildings are the county courthouse, the Montgomery Hospital, the high school, the McCann Library, the Masonic Temple, the city hall, and the Agnes Stinson Home for Old Ladies. Other features include the Montgomery Cemetery and the Schuylkill Bridge. It has manufactures of glass, cotton and woolen goods, ironware, oil, flour, hardware, and machinery. Intercommunication is by a system of electric railways. The place was settled in 1688 and incorporated in 1812. Six miles northwest is Valley Forge. Population, 1900, 22,265; in 1920, 32,319.

NORTH, Frederick, Lord, Earl of Guilford, Prime Minister of England, born April 13, 1733; died Aug. 5, 1792. He was educated at Eton and Oxford, made a tour of continental Europe soon after graduation, and in 1754 secured an election to the House of Commons. In 1759 he became Lord of the Treasury. As such officer he advocated the stamp act and maintained the right of England to tax the colonies in America. He was Chancellor of the Exchequer and leader of the House of Commons in 1767, and from 1770 to 1783 served as First Lord of the Treasury and Prime Minister of England. The policy of George III. for the coercion of the colonies met his approval, and his insistence finally led to the Declaration of Independence in America on July 4, 1776. As head of the government he managed the war against America, and, after the defeat at Yorktown, he resigned, since the failure of the king's efforts became manifest. His father died in 1790, when he became Earl of Guilford.

NORTH, John Thomas, financier, born in Leeds, England, Jan. 30, 1842; died in London, May 5, 1896. He was the son of a coal merchant, was apprenticed to a millwright in 1857, and later became foreman of the Fowler Locomotive Works at Leeds. He emigrated to Chile after the death of his father and there engaged in speculations in guano and nitrate of soda, in the province of Tarapacá. In 1889 he returned to England with a fortune valued at $100,000,000, all of which he acquired by various enterprises during an absence of twenty years, and became noted as a lavish entertainer and owner of fast horses. He gave liberal endowments to the Yorkshire College of Science and the Leeds Infirmary. In 1885 he contested as a Conservative for a seat in Parliament, but was defeated by Herbert Gladstone. His death occurred suddenly while presiding as chairman of a business meeting.

NORTH ADAMS, a city of Massachusetts, in Berkshire County, on the Hoosac River, 21 miles north of Pittsfield. It is on the Boston and Maine and the Boston and Albany railroads. The site is in a beautiful locality of the Berkshire Hills, near Mount Greylock, the highest summit in the State. Among the chief buildings are the public library, the State normal school, the city hall, and the North Adams Hospital. Hudson Park, the natural bridge across Hudson Brook, and the Hoosac Tunnel are other features. The manufactures include boots and shoes, cotton and woolen goods, ironware, machinery, and earthenware. It has extensive street railways, waterworks, pavements, sewerage, and fine public schools. The place was settled in 1765 and incorporated in 1878. Population, 1905, 22,125; in 1925, 22,717.

NORTH AMERICA, one of the six grand divisions of the earth, the larger and more northerly continent of the Western Hemisphere. The northern boundary is formed partly by the Arctic Ocean and partly by vast sheets of ice, the land masses probably extending within a few hundred miles of the North Pole. It is bounded on the east by the Atlantic and on the south and west by the Pacific. The maximum breadth is about 3,300 miles and the length from north to south is 4,500 miles. Recent estimates place the area at 8,350,000 square miles.

DESCRIPTION. The coast line is extremely irregular, especially in the north, where many peninsulas and the Arctic Archipelago form a counterpart of the southeastern section of Asia. Point Barrow and the Melville Peninsula form the principal projections on the north; Labrador, on the northeast; Nova Scotia, Florida, and Yucatan, on the east; and Lower California and Alaska, on the west. The Isthmus of Panama joins the continent with South America. Among the principal coast indentations are Hudson Bay, on the north; the Gulf of Saint Lawrence, the

MAP OF NORTH AMERICA.

Bay of Fundy, Penobscot Bay, Chesapeake Bay, the Gulf of Mexico, and the Gulf of Honduras, on the east; and the Gulf of Tehauntepec, the Gulf of California, the Strait of Juan de Fuca, and Bristol Bay, on the west. Many islands of considerable size are included with the continent, but they are situated chiefly off the northern and eastern coasts. They include Iceland, Greenland, Baffin Land, Victoria Land, Newfoundland, the Bahamas, Cuba, Hayti, Porto Rico, and Jamaica. Among the principal islands off the western shore are Vancouver, the Queen Charlotte Islands, and the Aleutian Islands.

Surface. Two great mountain systems characterize the surface, the Appalachian Mountains in the eastern part, parallel to the Atlantic Coast, and the Cordilleras, parallel to the Pacific. Between the two sections of highlands is the Mississippi valley, which is separated from the central plain of Canada by a height of land, a low watershed stretching almost due west from Lake Superior to the Rocky Mountains. The Appalachian highlands stretch from the Gulf of Saint Lawrence almost to the Gulf of Mexico, forming a low plateau, which is known locally under different names, such as the Laurentian Hills, the White Mountains, the Catskills, the Allegheny Mountains, and the Blue Ridge Mountains. Mount Mitchell, near the southern extremity of these highlands, has an elevation of about 6,700 feet and is the culminating peak, but is closely approximated by Mount Washington, in the White Mountains. Between these highlands and the Atlantic are two distinct surfaces, the Atlantic coast plain, near the ocean, and the Piedmont plain, forming the country farther inland. Westward the Appalachians slope gradually inland and finally merge into a region of rolling prairies.

The Cordilleras are a continuation of the Andes of South America, trending almost without interruption from the Isthmus of Panama to Bering Strait. The eastern chain is known as the Rocky Mountains, which forms the predominating system of North America. It consists of a vast plateau with an altitude varying from 2,800 to 10,000 feet above the sea, but reaching its highest point in Alaska, where Mount McKinley attains a height of 20,464 feet. In the same vicinity are other lofty peaks, such as Mount Saint Elias, Mount Fairweather, Mount Logan, and a number of others, all exceeding an altitude of 18,000 feet. The system gradually widens in the southwestern part of Canada, but reaches its greatest width in the United States, and two distinct chains, the Cascade Range and the Sierra Nevada Mountains, trend along the coast. Here many of the peaks exceed a height of 14,000 feet, such as Mount Shasta, Mount Whitney, Long's Peak, and Pike's Peak. Greater heights than these are reached in Mexico, where Popocatepetl and Orizaba tower above the snow line, the former being 17,520 feet and the latter, 18,250 feet high. The Great Basin, an elevated and arid section in the west central part of the United States, has many salt lakes that find no outlet to the sea, such as Utah Lake and Great Salt Lake.

Drainage. The greater part of North America is drained into the Atlantic, but large sections are tributary to the Pacific and the Arctic oceans. However, nearly all the great rivers belong to the central part of the continent. The McKenzie and its head streams, including the Peace and the Athabasca, carry the drainage from the north central part of Canada into the Arctic, while the northwestern portion is drained by the Yukon into the Pacific. Farther south are the head streams of the Nelson, including principally the Saskatchewan and the Assiniboine, which discharge into Hudson Bay. Still farther south, but somewhat east, is the basin of the Great Lakes and the Saint Lawrence, which is tributary to the Atlantic through the Gulf of Saint Lawrence. The central portion is drained almost entirely by the Mississippi system, which discharges into the Gulf of Mexico. The Fraser, Columbia, and Colorado discharge into the Pacific. Among the principal streams of the Atlantic coast are the Susquehanna, the Hudson, the Delaware, the Potomac, and the Savannah. Mexico has few large streams, aside from the Rio Grande, which separates that country from the United States. The continent has many lakes, but they are most numerous in the central and northern sections. Among the larger lakes may be named Ontario, Erie, Huron, Michigan, Superior, Great Salt Lake, Winnipeg, Winnipegosis, Athabasca, Great Slave, and Great Bear lakes.

Flora and Fauna. The flora is varied greatly, ranging from the plants that thrive in the tropics to those peculiar in the Arctic regions. In Alaska and the northern part of Canada vegetation is very scant, since the ground is frozen the entire year. In this region only the surface thaws out in the summer, forming the tundra, where dwarf willows and reindeer moss constitute the prevailing plant life. Birch and Spruce forests are found as far north as the Arctic Circle, whence southward the size and variety of trees increase rapidly. Here are found fine forests of fir, pine, hemlock, and spruce. These woods merge into the great firs, pines, and redwoods found from British Columbia southward to California. Extensive forests prevail in Eastern Canada and the eastern and northern sections of the United States, but a large prairie region stretches through the greater portion of the central part of the continent, where the surface is well supplied with nutritious grasses. Although many of the streams are bordered by belts of deciduous timber a large treeless section extends from Sascatchewan southward into Mexico, comprising the Great Plains, between the Rocky Mountains on the one hand and the Great Lakes and the Mississippi on the other. An arid section character-

izes the country on both sides of the Rocky Mountains, where cacti, yucca, sage brush, and thorny desert shrubs are numerous.

The animals of North America are very similar to those found in the northern zones of the Old World, but they differ materially from those common to South and even to Central America. Among the animals that are peculiar to the continent are the skunk, the puma, the musk ox, the pronghorn, and several species of pouched rats. No traces of camels, horses, swine, and rhinoceroses are found in the recent strata. The more important animals include the bison, bear, otter, deer, wolf, antelope, moose, reindeer, beaver, bighorn fox, raccoon, opossum, and many species of birds. Among the larger birds are the wild turkey, heron, crane, falcon, vulture, owl, flamingo, goose, duck, pelican, swan, crow, and turkey buzzard. The smaller birds are likewise numerous, such as the swallow, robin, parrot, oriole, lark, thrush, blackbird, snipe, and humming bird.

Two families of monkeys are found in the southern part, but they are peculiarly different from those of the Old World. The reptiles include the lizard, the rattlesnake, the adder, the alligator, and many species of turtles. Insect life is abundant in the central and southern parts, but diminishes or is entirely absent in the extreme north. They include butterflies, beetles, moths, flies, and bees. Fish are abundant in the Great Lakes and rivers, as well as in the coastal waters. Chesapeake Bay has the most valuable oyster fisheries, but oyster beds are found abundantly on both the Atlantic and the Pacific coasts. Salmon fisheries are especially productive near the mouths of the Columbia, the Fraser, and the Simpson rivers. Other fishes include the cod, pike, pickerel, halibut, sturgeon, and herring. The domestic animals correspond to those of Europe rather than those of Asia, but much has been done to improve the breeds by skillful propagation.

Inhabitants. North America was inhabited by a race of copper-colored people at the time it

PUEBLO INDIAN.

SIOUX INDIAN.

was discovered by the Europeans. They were named *Indians* from the circumstance that it was presumed by some writers that the new continent comprised a part of India. At the time of discovery, in 1492, the natural aspect was wild and grand. The northern portion was occupied largely by the Eskimos and the southern section was inhabited by the Aztecs, while the central part comprised the hunting ground of the race generally known as Indians. These races have become nearly extinct, partly by a natural decline under the progress of civilization and partly because of intermarriages and a natural assimilation by the Europeans. At present the population consists principally of descendants from Europeans, but practically all nationalities are represented, although the Germans, Irish, English, Spaniards, Scotch, and French predominate, in the order named. In addition to the Europeans and their descendants must be reckoned a large element of African descent and a considerable number of Jews, Japanese, and Chinese. Canada is inhabited largely by people of English, French, and Irish descent. The larger number of Negroes are found in the United States, principally in the southern section. Mexico and Central America are inhabited principally by people of Spanish descent, but many creoles, Negroes, and Indians are in that portion of the continent. The total population, including the adjacent islands, in 1922, was estimated at 139,128,346.

Political Divisions. The countries of North America are principally republics. The governments have been organized on territory which was formerly included within the sphere of influence of some European country, but in some instances the independent governments made claims to sections that were not so regarded, as in the case of the claim made upon Oregon by the United States. Great Britain has possession of the northern part of the continent, including Newfoundland and the Dominion of Canada, and also has Belize, or British Honduras, and a number of islands in the West Indies. Iceland and Greenland constitute Danish America. France has the islands of Miquelon and Saint Pierre. Several islands in the West Indies belong to Denmark. The independent governments include the United States, Mexico, Cuba, Honduras, Guatemala, Costa Rica, Nicaragua, San Salvador, Haiti, Panama, and San Domingo.

History. The Northmen settled in Greenland and Iceland at an early date and visited the northeastern part of the continent about 1001, when Lief Eric explored a part of the coast. However, permanent settlements were not developed until more than a century after the discovery by Columbus, in 1492. John Cabot was the first European to set foot upon the continent, in 1497. It was named America from Amerigo Vespucci, a Florentine traveler, who wrote the first extensive description of the New World. Vasco da Gama made a tour in the 15th century and established the Portuguese claim to the West Indies and the northeastern coast of South America. Magellan and other Spaniards made claims for Spain in the early

NORTH AMERICA
(Political)
SCALE
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760 Statute Miles to one inch
Capitals of Countries ★ Other Cities •
Comparative Area
KANSAS
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Peary, April 6, 1909
ARCTIC OCEAN
PACIFIC OCEAN
ATLANTIC OCEAN
GULF OF MEXICO
CARIBBEAN SEA
DOMINION OF CANADA
UNITED STATES
MEXICO
CENTRAL AMERICA
SOUTH AMERICA
GREENLAND (TO DENMARK)
ICELAND (TO DEN.)
NEWFOUNDLAND
LABRADOR
HUDSON BAY
BAFFIN BAY
BAFFIN ISLAND
ALASKA
ALASKA RANGE
ROCKY MOUNTAINS
GREAT PLAINS
THE GREAT LAKES
WEST INDIES
BAHAMA ISLANDS (BR.)
BERMUDA Is. (BR.)
HAITI
JAMAICA (BR.)
PORTO RICO (TO U. S.)
TROPIC OF CANCER
EQUATOR
ISTHMUS OF TEHUANTEPEC
ISTHMUS OF PANAMA
PANAMA CANAL (U.S.A.)
Longitude 120° West from Greenwich
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(Opp. 1988)

part of the 16th century. They were soon followed by Cortez, Pizarro, Ponce de Leon, and other Spaniards. Efforts were made by the French to establish settlements on the northeastern coast of North America, but the first permanent European settlement was made by the English, at Jamestown, Va., in 1607. The following year a permanent settlement was made by the French at Quebec, which developed slowly as a base of influence. The English made a second settlement at Plymouth, Mass., in 1620, when the Pilgrim Fathers landed with the *Mayflower*. In the meantime the Dutch established a foothold under Hudson in New York and the Swedes developed a settlement in Delaware, in 1638, but the latter was absorbed by the Dutch in 1655. Still later the Russians came across Bering Strait and made settlements in Alaska.

The early settlements by different nations of Europe soon caused conflicting claims to territory. These claims were the occasion of several wars, which eventually resulted in Great Britain coming into possession of the northern part of the continent, except Alaska, which remained in possession of Russia, while Spain occupied the southern part. In 1776 the thirteen British colonies located south of Canada declared their independence and established the republic of the United States. Ultimately that country acquired Florida and the Territory of Louisiana by purchase, annexed Texas, and acquired the southwestern part of its present possessions through a war with Mexico. Great Britain retained a permanent foothold in Newfoundland and Canada, but Spain lost all of Mexico and Central America by revolutions. The last vestige of Spanish rule disappeared in 1898, when Cuba and Porto Rico were severed from that country. History contains no other example of growth and development so wonderful as that witnessed in North America. The English settlement at Jamestown and the French settlement at Quebec may be said to comprise the two great events which laid a foundation for the development of a new civilization and a larger progress, which are vying with the historical systems of Europe in the upbuilding of institutions.

NORTHAMPTON (nôrth-ămp'tŭn), a city in Massachusetts, county seat of Hamsphire County, seventeen miles north of Springfield, on the Connecticut River. It is on the Boston and Maine and the New York, New Haven and Hartford railroads. The place is connected with Hadley by a bridge 1,230 feet long. Among the principal buildings are the county courthouse, the Academy of Music, the Burnham Classical School for Girls, the public high school, and several hospitals. It is the seat of Smith College, the State Hospital for the Insane, and the Clarke Institute for the Deaf. Mount Tom and Mount Holyoke are near the city. It has manufactures of hair brushes, cotton textiles, silk and woolen goods, stoves, wire, paper, sewing machines, baskets, and machinery. It was settled in 1654 and soon after was named after Northampton, England. Jonathan Edwards resided here from 1727 until 1750. Population, 1905, 19,942; in 1925, 24,145.

NORTHAMPTON, a city of England, in Northamptonshire, sixty miles northwest of London. It is surrounded by a productive agricultural and stock-raising country. Among the noteworthy buildings are the townhall, the public library, the Church of Saint Peter, the Church of Saint Sepulchre, and the Commercial Exchange. The manufactures include boots and shoes, spirituous liquors, flour, paper, leather, metal goods, and machinery. It has systems of waterworks, sanitary sewerage, and electric street railways. The place was founded by the Saxons. Population, 1921, 90,076.

NORTH ATTLEBORO (ăt'tl-bŭr-ō), a town of Massachusetts, in Bristol County, thirty miles southwest of Boston. It is on the New York, New Haven and Hartford Railroad and has communication by several electric railways. The chief buildings include the public library, the townhall, and the high school. It has manufactures of jewelry, machinery, and utensils. The surrounding country is fertile. It was incorporated as a town in 1887. Population, 1905, 7,878; in 1925, 9,790.

NORTH BRADDOCK (brăd'dŭk), a borrough of Pennsylvania, in Allegheny County, ten miles east from Pittsburg. It is on the Pennsylvania Railroad, and is a residential and manufacturing center. The principal products are steel rails, cigars, machinery, and clothing. It has waterworks and well-improved streets. It was incorporated in 1897. Population, 1900, 6,535; in 1920, 14,928.

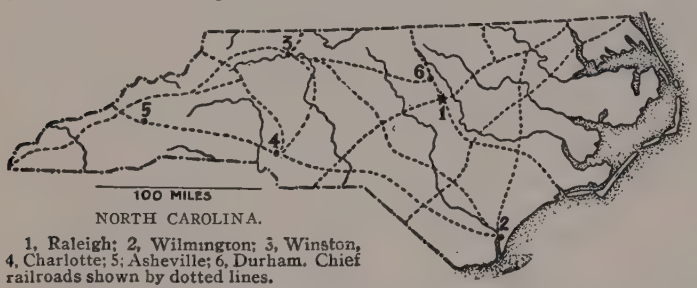
NORTHBRIDGE, a town of Massachusetts, in Worcester County, at the confluence of the Blackstone and the Mumford rivers. It is located twelve miles southeast of Worcester, with which it is connected by the New York, New Haven and Hartford Railway. The public improvements include a library, waterworks, sanitary sewerage, and street paving. It is a manufacturing center of machinery, coated paper, and cotton and woolen goods. The first settlement on its site was made in 1662, but it remained a part of Mendon until 1772, when it was incorporated as a separate town. Population, 1905, 7,400; in 1925, 10,051.

NORTH CAPE, the most northern point of Europe, forming a rocky promontory on the island of Magero, which is separated from Norway by a narrow channel. The point forming the extreme northern projection of the continent of Europe is a few miles south and 45 miles east of North Cape, and is called Cape Nordkyn.

NORTH CAROLINA (kăr-ō-lī'nà), one of the original thirteen states of the United States, popularly called the *Old North State*. It is bounded on the north by Virginia, east by the Atlantic Ocean, south by Georgia and South

Carolina, and west by Tennessee. The length from east to west is 502 miles, the width is from 20 to 188 miles, and the average breadth is about 100 miles. The area is 52,250 square miles, being exactly the same as the area of Alabama. It includes a number of coast lagoons, hence the land surface covers only 48,580 square miles.

DESCRIPTION. The western part of the State is crossed by the Appalachian Mountains, which form the natural boundary between it and Tennessee. These highlands are elevated from 2,000 to 5,000 feet above sea level and include the Great Smoky and Blue Ridge mountains. The former trend along the border of Tennessee, while the latter are located a short distance toward the east. Mount Mitchell, one of the peaks of the Black Mountains, has an elevation of 6,711 feet and is the highest summit in the State. East of the Blue Ridge is the Piedmont plain, which has a general elevation of 200 to



NORTH CAROLINA.

1, Raleigh; 2, Wilmington; 3, Winston, 4, Charlotte; 5, Asheville; 6, Durham. Chief railroads shown by dotted lines.

1,200 feet, and its surface is quite rugged and hilly in the western and generally level in the eastern parts. Between the Piedmont plain and the Atlantic is the coastal plain, which is a level and sandy region about 140 miles wide. It is characterized by swamps and shallow coast lagoons, of which Pamplico and Albemarle sounds are the largest. Forests of pine and cedar abound in the coastal plain. Farther inland are stretches of timber made up largely of walnut, magnolia, birch, sycamore, cherry, ash, oak, maple, holly, and hickory.

The drainage is chiefly to the southeast, the general surface sloping in that direction, but the region east of the Blue Ridge belongs to the Mississippi basin. Here the drainage is by the headstreams of the Tennessee River, which include the French Broad and Little Tennessee. Albemarle and Pamplico sounds receive the inflow from the Tar, Roanoke, and Neuse rivers, all of which belong to the northern half of the State. The Cape Fear River drains the southeastern part. It receives the South River and several other streams and flows into the Atlantic near Cape Fear. The Yadkin, or Great Pedee, and the Catawba drain the southern part and cross the border into South Carolina. Many of the rivers have extensive estuaries and furnish facilities for communication, and the streams flowing through the Piedmont plain are a source of great water power. The lakes are shallow and confined chiefly to the coastal plain.

The State has a variety of climates, owing to differences in altitude, being subtropical along the coast and temperate in the western part. Near the coast the mean temperature is 60° and in the mountains it is 56°, while the extremes range from 10° to 100°. In the coast region the annual rainfall is 60 inches and in the interior about 45 inches, while the average for the State is 53 inches. Considerable snow falls in the mountains, where the winters are quite cold and severe. Navigation is sometimes endangered along the coast by the subtropical storms. As a whole the climate is healthful and agreeable.

MINING. The State has a large variety of minerals, but the annual output is not large compared to the resources. Mica and corundum are obtained in the region west of the Blue Ridge, where the deposits are extensive and valuable. Iron ore is an important product, but the output is much smaller than that obtained in the vicinity of the Great Lakes. The central part of the State has extensive coal fields, and these are worked in Chatham and in several other counties. Clays suitable for pottery and brick are abundant and the output takes rank among the leading mineral products. Granite and limestone are quarried for monuments and building purposes. Other minerals include talc and soapstone, gold, silver, copper, mineral waters, and phosphate rock.

AGRICULTURE. Agriculture continues to be the leading industry. In the western section the land is broken and mountainous and the coast region is swampy, hence only 74 per cent. of the land is included in farms, which average 101 acres. The area farmed is greater at present than in any period of its history, which is accounted for by the fact that about one-fourth of the farms are operated or owned by colored farmers, many of whom formerly were slaves, and the size of these farms is less than one-half that of farms operated by white men. Corn is grown on a larger area than any other crop and it is followed in area by cotton. Wheat of a fine quality is grown on a large acreage. Other crops include oats, hay, tobacco, peanuts, sweet potatoes, and rye. A large area along the tide-water rivers is utilized in cultivating rice, dykes being maintained for flooding and draining the surface. In Hyde and several other counties rice is cultivated on lands flooded by pumping. Sugar cane, peas, grapes, and other fruits are grown profitably.

Stock raising is a growing industry, both in the number of head of animals and in improving the grades. Swine are raised very extensively and large quantities are shipped to points

outside the State. Dairying was long neglected, but has more recently grown into an important industry. Large interests are vested in growing cattle both for meat and dairy products. Other live stock includes horses, mules, and poultry.

MANUFACTURES. A large increase is shown in the value of manufactures within the last decade. Cotton goods stand at the head of the list and greatly exceed in value the output of any other product. Cigars and tobacco products hold second place in the list, and these are followed closely by the output of lumber and timber products. Large interests are vested in the manufacture of flour, furniture, cotton-seed oil and cake, fertilizers, and tanned and finished leather. In the output of chewing and smoking tobacco the State is exceeded only by Missouri, and in the manufacture of cotton goods it is surpassed only by the State of Massachusetts. The consumption of cotton in the mills exceeds the production, hence, considerable quantities are imported. Winston, Charlotte, and Wilmington are the leading manufacturing centers.

Considerable material for manufacturing is furnished by the fisheries off the coast and the estuaries of several streams. Extensive beds of oysters abound along the coast and herring, shad, and turtles are taken in large numbers. Although considerable of the output is shipped in a fresh state, the canning of fish and oysters as well as fruits is showing constant development. Dare and Carteret counties are the leading centers of the fish canning industry.

COMMERCE AND TRANSPORTATION. Wilmington and Pamplico are customs districts and through these pass the foreign exports. Cotton goods, lumber, tar, turpentine, fish, flour, and live stock are the principal exports, while the imports include raw cotton, coffee and tea, and machinery. Transportation is favored by an extensive seaboard on the Atlantic and a number of navigable streams. The railway lines in operation include a total of 4,950 miles, and considerable communication facilities are provided by electric railways in different parts of the State. Among the trunk lines passing through the State are the Southern, the Seaboard Air Line, and the Atlantic Coast Line, all of which have numerous branches.

GOVERNMENT. The constitution now in force was adopted in 1868. It vests the executive authority in the governor, lieutenant governor, secretary of State, auditor, treasurer, attorney general, and superintendent of public instruction, each elected for four years by general suffrage. The governor, auditor, treasurer, secretary of State, and superintendent of public instruction constitute the council of State. Legislative authority is vested in the Legislature, which consists of a senate of 50 and a house of representatives of 120 members, all of whom are elected for a term of two years. Meetings of the Legislature are held biennially, beginning on the Wednesday after the first Monday in January. A chief justice and four associates constitute the supreme court, and subordinate to it are the superior courts, which are composed of judges elected in districts. Local government is administered by the counties and municipalities, in which the usual administrative officers are elected by the people.

EDUCATION. The organization of the State department of education consists of the State board of education, the State superintendent of public instruction, the State board of examiners, the superintendent of the colored normal schools, and the public high school inspector. Supervision by the State department is effected principally through the superintendents of the several counties, who are the administrative officers of the county boards of education. The county superintendents have personal charge of the examination of teachers, visit the schools when in session, and have general supervision of the public educational work of their counties. To these superintendents the State department of education, through its superintendent, furnishes the necessary office blanks, including plans and specifications for schoolhouses, which are required to be followed in the construction of school architecture. Bulletins, reports and addresses, and teachers' manuals are published by the State department to further and systematize public instruction. Recent years show a remarkable uplift in the extension of educational work, the founding of libraries, and the improvement of school architecture. About 180 public high schools are maintained, and these are under the general direction of the high school inspector.

The University of North Carolina, at Chapel Hill, is the head of the public school system. Other State institutions include the North Carolina State College of Agriculture, Raleigh; the Normal and Industrial College, for girls, Greensboro; the East Carolina Teachers' Training School, Greenville; the Appalachian Training School, Boone; the Cullowhee Normal School, Cullowhee; the School for the Blind, Raleigh; and the School for the Deaf and Dumb, Morgantown. The institutions maintained for Negroes include the Agricultural and Mechanical College, Greensboro; the Slater State Normal School, Winston; the State Normal School, Fayetteville; the State Normal School, Elizabeth City; and the School for the Deaf, Dumb and Blind, Raleigh. Many private and denominational colleges are maintained, including Duke University (Methodist), Durham; Wake Forest College (Baptist), Wake Forest; Davidson College (Presbyterian), Davidson; Guilford College (Quaker), Guilford College; Elon College (Christian), Elon College; Baptist University for Women, Raleigh; Greensboro Female College (Methodist), Greensboro; Peace Institute (Presbyterian), Raleigh; Normal and Collegiate Institute (Presbyterian), Asheville;

and Salem Female Academy and College (Moravian), Winston-Salem. Hospitals for white insane are at Raleigh and Morgantown and one for colored patients is at Goldsboro. Raleigh is the seat of the State penitentiary and of the Confederate soldiers' home.

INHABITANTS. North Carolina has the smallest foreign-born population in the Union next to South Carolina, only 7,099. Nearly one-half of the people are Baptists. Other denominations represented largely include the Methodists, Presbyterians, Lutherans, Disciples of Christ, and Episcopalians. Raleigh, in the central part of the State, is the capital. Other cities include Wilmington, Charlotte, Asheville, Winston-Salem, New Bern, Durham, and Concord. In 1900 the State had a population of 1,893,810. This included a total colored population of 630,207, of which 5,748 were Indians and 624,469 Negroes. Population, 1920, 2,556,486.

HISTORY. North Carolina was first settled in 1584, when Walter Raleigh landed an expedition on Roanoke Island, but this colony did not prove successful. In 1653 the first permanent settlement was founded at Albemarle by Roger Greene, who came there with a colony of Virginian dissenters. Another settlement was made on the Cape Fear River by New Englanders in 1660, but these left soon after. Other settlements rapidly followed and proved more successful. The Tuscarora Indians opened a war upon the whites in 1711, when several hundred settlers were massacred, but troops from Virginia and South Carolina broke the power of the natives. In 1729 North Carolina became a royal province. The settlers were among the first to protest against arbitrary legislation on the part of England and on May 20, 1775, the inhabitants of Mecklenburg County met at Charlotte and there adopted the Mecklenburg Declaration of Independence. It was likewise foremost in supporting independence, being the first to instruct its delegates in Congress to support that measure, which it did on April 12, 1776. This date is commemorated in the State as a public holiday.

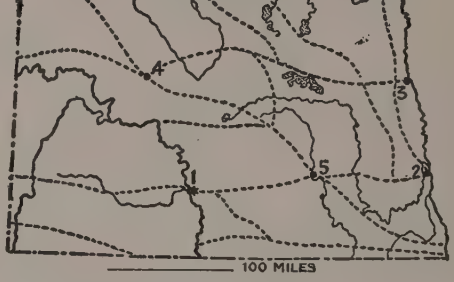
The first State constitution was made in 1776 and the Federal Constitution was ratified on Nov. 21, 1789, being the last State to ratify that document. During the Revolution North Carolina furnished troops for many of the important battles and was invaded by the British in 1780. It did not take part in the first presidential election, not having ratified the Federal Constitution at the time. Raleigh was made the capital in 1791 and the State University was opened for students in 1795. The State passed articles of secession in 1861 and at various times in the Civil War was the seat of engagements, the principal one being the Battle of Fort Fisher in 1865. It furnished 120,000 soldiers to support the Confederacy and took an important part in the contest. Since the Civil War it has developed rapidly. In 1900 it adopted the policy of requiring a property and an educational test for voting. The State has made material progress the last two decades, but the natural resources are open to a still further enhancement of value.

NORTH CAROLINA, University of, an accredited State institution at Chapel Hill, N. C., established in 1789 and opened in 1795. It comprises a collegiate department, schools of medicine, law, pharmacy, and commerce, and a summer school for teachers. The library has 151,060 volumes, the campus covers 48 acres, and the property has a value of $6,000,000. It has a faculty of 170 professors and instructors and is attended by about 2500 students.

NORTHCOTE (nôrth'kŏt), **Sir Stafford Henry.** See **Iddesleigh, Earl of.**

NORTH DAKOTA (dȧ-kō'tȧ), a north central state of the United States, popularly called the *Flickertail State*. It is bounded on the north by Saskatchewan and Manitoba, east by Minnesota, south by South Dakota, and west by Montana. The length from east to west is 360 miles; breadth, 212 miles; and area, 70,795 square miles. In shape it is a rectangle with straight boundary lines, except on the east, where the Red River of the North separates it from Minnesota.

The surface consists almost entirely of an undulating prairie. In the eastern part is the level bed of the ancient Lake Agassiz, which has an elevation of 800 to 1,000 feet above sea level. The Turtle Mountains, which extend into the State from Manitoba and whose summits are about 2,300 feet above sea level, are situated in the north central part. Through the southwestern part flows the Missouri River, parallel to



NORTH DAKOTA.

1, Bismarck; 2, Fargo; 3, Grand Forks; 4, Minot; 5, Jamestown. Chief railroads indicated by dotted lines.

which extends the grassy Plateau du Coteau du Missouri, which ranges from 2,000 to 3,000 feet above the sea, being highest in the southwestern corner of the State. In the west central part, especially along the Little Missouri, the surface is very broken and hilly. This region is characterized by isolated conical buttes, and a portion of it belongs to the Bad Lands that extend across the border into South Dakota.

The drainage belongs principally to the Missouri River, which enters the State from Mon-

tana, flows toward the east and south, and passes at the middle point of the south boundary into South Dakota. It receives the Cannon Ball, Heart, Knife, and Little Missouri from the southwest and the Livingston from the northwest. The James or Dakota River drains much of the central part, crossing the border into South Dakota, where it joins the Missouri. A large part of the north central region is drained by the Souris or Mouse River, which flows into the State from Canada, but reënters that country after forming a long and narrow loop. All of the drainage in the eastern portion is by the Red River of the North, which receives the inflow from the Sheyenne and the Pembina. The only body of water of large extent is Devils Lake, situated in the northeastern part of the State, which has no outlet to the sea. Small lakes and lagoons are distributed in many parts of the Plateau du Coteau du Missouri.

The winters are cold, but, owing to the dry atmosphere, they are sunny and pleasant, while the summers are warm. All seasons of the year are remarkably healthful. In January the mean temperature is 3° and in July it is 70°, and the extremes range from 40° below zero to 98° and even 108° above. Rainfall is scant in the western part of the State, where it ranges from twelve to twenty inches, but in the eastern part it reaches 28 inches. The precipitation is largely in the growing season from April to July, and the soil is peculiarly fitted to withstand considerable drought. Storms and blizzards occur in winter, but the fall of snow is light.

Mining. Though mining has not been developed to the extent of its possibility, considerable quantities of mineral products are obtained. Extensive fields of lignite coal are found in the central and western sections, and mining is developed most extensively in the vicinity of Wilton and Minot. The output is used chiefly for domestic purposes and local manufactures. Building stone of a fine quality is distributed throughout the Turtle Mountains and along many of the streams. Fire and brick clays are abundant and natural cement is found in many places. Mineral waters, salt, iron ore, and sand suitable for making glass are available. In 1925 the mineral products had a value of $3,125,000, of which lignite coal constituted the largest share.

Manufactures. The State has developed extensive manufacturing enterprises within the last decade, though the products are limited quite largely to the resources obtained from the farms. Flour and grist make up fully half the output. Milling is not confined to a few large establishments, but is distributed in small enterprises throughout the agricultural region. Printing and publishing hold second rank as manufacturing enterprises, but they are followed closely by the dairy products, including both canned milk and cheese. Many repair and machine shops are maintained. Other manufactures include earthenware, brick and tile, clothing, cigars, machinery, and packed meats.

Agriculture. The land in most sections of the State is easily tilled and much of it is unusually fertile. This is true particularly of the valley of the Red River and nearly all of the level surface. Large tracts in the central part were originally covered with glacial boulders, but the land in this region is a fertile black or brown loam, and much of it has been cleared of stones for cultivation. About 65 per cent. of the farm area is improved. Some of the farms are large, but the average size is 242 acres. Wheat is the leading crop and is grown on about half of the cultivated acreage. Oats and flax rank next to wheat. Other crops include barley, rye, hay, potatoes, and small fruits. North Dakota has usually taken first rank in the production of flaxseed, first in spring wheat, and third in barley. Wheat grown in North Dakota is celebrated for its fine flour-making quality.

The live-stock industry was formerly confined largely to extensive ranches, but these have been reduced in size and increased in number. Cattle are grown both for meat and dairy purposes. A fine grade and a large number of horses are raised. Sheep rearing is an extensive enterprise in the grazing regions of the central and western parts. Other live stock includes swine, mules, and poultry.

Transportation and Commerce. The Great Northern and the Northern Pacific trunk lines cross the State from east to west, while the Saint Paul, Minneapolis and Sault Ste. Marie crosses from the southeastern to the northwestern part, and the transcontinental line of the Chicago, Milwaukee and Saint Paul passes through the southwestern part. All these great railways as well as the Chicago and Northwestern Railroad have branches in many parts of the State. The railways have a total of 5,300 miles. Both the Missouri and the Red River are navigable part of the year, but they are not used extensively. The commercial interests are extensive. Large quantities of wheat, flaxseed, oats, flour, and live stock are exported. The imports consist mainly of clothing, merchandise, chemicals, and machinery.

Government. The constitution was adopted in 1889, when the State was admitted. It vests the executive authority in the governor, lieutenant governor, secretary of State, auditor, treasurer, attorney-general, superintendent of public instruction, commissioner of agriculture, commissioner of insurance, and three railroad commissioners. Each of these officers is elected for two years. The Legislature is constituted of two branches, a senate of not less than 30 and not more than 50 members and a house of representatives of not less than 60 nor more than 140 members. The senators are elected for four and the representatives for two years. Biennial sessions of the Legislature are held, beginning on the Tuesday after the first Monday in Janu-

ary. Five judges elected for six years constitute the supreme court, which is the highest judicial authority. Subordinate to it are the district courts, the judges of which are elected for four years. Local government is administered by the townships, municipalities, and counties.

EDUCATION. Liberal support is given by the people to further public education. The Federal government donated about 3,000,000 acres of land to the State, the proceeds of the sale of which constitute a permanent fund which can never be diminished. This fund amounts to about $14,000,000, practically all of which is invested in bonds of the State, county, school district, township, and city and in first mortgages on farm real estate. Fully 2,000,000 acres of State school lands remain unsold, but the annual income from the permanent funds already amounts to over $500,000. A two-mill tax is levied for school purposes upon all taxable property within the State and is apportioned in the counties where collected, this tax yielding each year over $400,000. Additional support of the schools is derived from local taxation. The length of the school term is 156 days. At present the rate of illiteracy among native whites is only 2.1 per cent.

The State University, located at Grand Forks, is at the head of the public school system. Fargo is the seat of the State agricultural college, which is rapidly becoming one of the strongest institutions of the kind in the United States. Three normal schools for the training of teachers are maintained at Minot, Mayville and Valley City. Ellendale is the seat of the State normal and industrial school; Wahpeton, of the school of science; Devils Lake, of the school for the deaf; and Bathgate, of the school for the blind. The reform school is at Mandan; the school of forestry, at Bottineau; and the school for the feeble-minded, at Grafton. The State penitentiary is at Bismarck; the asylum for the insane, at Jamestown; and a soldiers' home, at Lisbon. A number of private and denominational schools and educational institutions are well patronized.

INHABITANTS. The State has a larger per cent. of foreign-born inhabitants than any other State in the Union and many native whites are of foreign parentage. The foreign nationalities represented chiefly include Canadians, Swedes, Germans, and Irish in the order mentioned. Lutheran is the principal Protestant denomination, including about one-third of all the church members. Other denominations well represented are the Methodists, Roman Catholics, Presbyterians, and Baptists. Bismarck, located in the central part of the State, is the capital. Other cities include Fargo, Grand Forks, Jamestown, Minot, Valley City, Dickinson, and Wahpeton. In 1900 the State had a population of 319,146. This included 7,434 colored inhabitants, of whom 148 were Japanese, 286 Negroes, and 6,968 Indians. In 1925 the population was 641,192.

HISTORY. The region included in North Dakota was acquired by the United States in 1803 by the Louisiana Purchase. The first permanent settlement was made by French-Canadians near Pembina in 1807. Lord Selkirk built a fort at that place in 1812, supposing, however, that the region belonged to the English. It was at different times a part of the territories of Missouri, Michigan, Wisconsin, Iowa, and Minnesota, and in 1861 it was organized with South Dakota as the Territory of Dakota, the name being derived from a tribe of Indians. It was admitted as a State on Nov. 2, 1889, after being separated from the region organized as South Dakota. The capital was at Yankton until 1883, when it was removed to Bismarck. It has been highly prosperous since the construction of railroads began, developing with remarkable rapidity in wealth and educational affairs.

NORTH DAKOTA, University of, a co-educational State institution at Grand Forks, N. D., established in 1883. Later the government granted 86,080 acres of land to this institution and 40,000 acres to the school of mines. It offers courses in arts, sciences, mining, literature, philosophy, didactics, law, medicine, civil and mechanical engineering, commercial branches, domestic science, and the different trades. The library contains 95,000 volumes and the university property is valued at $2,250,000. It has a faculty of 112 professors and instructors, endowments of $1,694,204, and about 1,700 students.

NORTHER (nôrth'ẽr), or **Cold Wave,** the name applied to a cold wind from the north, blowing from Canada southward over the United States. The winds of this class are most common in the great plains of North America. They appear to originate in the northwestern part of Canada, whence they move southward across the western part of the Mississippi valley, extending across the Gulf of Mexico and Yucatan. It is possible to predict them in advance from 24 to 36 hours, and in the United States they are forecast by hoisting the cold-wave flag. They move near the surface, rarely rising more than 5,000 feet above the level. In winter they frequently cause the thermometer to fall below the freezing point, but during the warmer season and in the southern sections they appear merely as cool waves.

NORTHMEN, or **Norsemen,** a name applied to the inhabitants of the coast regions of Scandinavia and north Germany, who were noted in the Middle Ages for their skill in navigating the sea. Their object in sailing was principally to secure profit from ravaging the coasts of other lands and to capture the vessels of other nations while at sea, for which purpose they fitted out many substantial fleets and manned them with the most efficient of their young men. They became known as the *Sea-kings,* or *Vikings,* were warlike, and carried their marauding expeditions to regions far remote. According to the inheritance laws of Scandinavian countries, the fortunes of noblemen passed to

the elder sons, hence the younger sons depended upon their success in resorting to a military life, and these continually recruited the Vikings, who were otherwise of the lower rank. These peoples worshiped the gods Thor and Odin and had no regard for the institutions of the people advanced in civilization. They accordingly found it congenial to prey upon monasteries, cathedrals, mosques, capitols, and all the institutions of civilized life.

After the 9th century the Northmen began to dream of conquest, for which purpose they visited the Hebrides and the coasts of France and Spain. Duke Rollo (860-932) secured from the French king, Charles the Simple, a cession of the region known as Normandy in 912, which was afterward organized into a powerful state and was the seat of influence by the Normans, who descended from the Northmen. This colony has an important place in the history of Eu-

VESSEL OF THE VIKINGS.

rope. In 1066 the Normans conquered England and their leader assumed the title of William the Conqueror. Later they adopted the language and religion of the French. The Northmen were not only powerful in making themselves felt in Western Europe, but crossed over to Iceland and Greenland, where they formed permanent settlements and maintained a government for centuries before America was discovered. In 986 Bjarne Herjulfson sailed from Europe for Iceland, but a storm caused him to be carried out of his course, and he landed in the region now occupied by Massachusetts, which he named *Vinland.* In the year 1001 Lief Ericsson landed on the shores of Newfoundland and Nova Scotia, which he named *Heluland* and *Markland,* meaning respectively Stoneland and Woodland. Later attempts were made to colonize the northeastern region of North America, for which purpose an Icelandic Northman named Thorfinn Karlsefne sailed from Greenland in 1007 with 160 men for Vinland, but it is thought that the expedition was lost at sea. See **Normans.**

NORTH POLAR EXPLORATION. See **Polar Expeditions.**

NORTHROP (nôr'thrŭp), **Cyrus,** educator, born at Ridgefield, Conn., Sept. 30, 1834. He graduated at Yale University in 1857, studied law, and in 1861 became clerk of the Connecticut house of representatives. Two years later he was made clerk of the senate. In 1863 he became professor of rhetoric and English literature at Yale, where he taught successfully until 1884, when he was made president of the University of Minnesota. While in this position, he did much to further the educational interests of the State and the Northwest.

NORTH SEA, or **German Ocean,** a great inlet from the Atlantic Ocean, on the northern coast of Europe. It has an area of 150,000 square miles. The deepest portion of the sea is along the shore of Norway, where it is about 200 fathoms, but most of the sea is quite shallow, having an average depth of about 35 fathoms. The North Sea is the seat of a vast commerce. On its shores are many noted commercial cities of the world, including Hull, London, Hamburg, Bremen, Edinburgh, Amsterdam. The Hague, and others, all of which have a location on its shores or are connected with it through extensive canal improvements. The fisheries yield vast products of cod, herring, haddock, ling, flatfish, and others. It receives the waters from the Scheldt, Rhine, Weser, Forth, Thames, Tweed, Tyne, Humber, Ouse, Tay, and Elbe, this inflow rendering its waters less salty than most of the larger seas. It has many inlets and is connected with the Atlantic Ocean by the Strait of Dover and the English Channel, and with the Baltic Sea by the Skager Rack, the Cattegat, and The Sound.

NORTH SEA CANAL, or **Holland and Amsterdam Canal,** an important ship canal of Europe, extending from Amsterdam to the North Sea. It crosses the narrow stretch of land between the Zuider Zee and Ymuiden Haven, on the North Sea. By this route seagoing vessels shorten the distance materially.

NORTH STAR. See **Pole Star.**

NORTH SYDNEY, a town in Cape Breton County, Nova Scotia, 5 miles northwest of Sydney, on the Canadian National and the Canadian Pacific railroads. It is located on Sydney Harbour and has brick yards, machine shops, granite works, and extensive fishing interests. The chief buildings include the Y. M. C. A., the Hamilton Memorial Hospital, the North Sydney Sailors' Institute, the Central High School, and the Regent and Park Street schools. It was incorporated in 1885. Population, 1921, 6,585.

NORTH TONAWANDA (tŏn-à-wŏn'dà), a city of New York, in Niagara County, on the Niagara River, ten miles north of Buffalo. It is on the Erie, the Lehigh Valley, an electric, and the New York Central railroads. The noteworthy buildings include the high school, the public library, the city hall, and many churches. It has manufactures of hardware, roofing material, steam piping, machinery, clothing, and merry-go-rounds. Electric railways, waterworks, pavements, and sewerage are among

the improvements. The place was chartered as a city in 1897. Population, 1925, 17,356.

NORTHUMBERLAND (nôr-thŭm'bẽr-land), the name formerly applied to a kingdom of Britain, but now to a maritime county in the northern part of England. The kingdom of Northumberland was founded by an Anglican chief named Ida in 547, when it extended from the Forth to the Tyne. On the progress of this political state from the 6th to the middle of the 8th century depended largely the subsequent development of Anglo-Saxon history. The kingdom of Deira, a region between the Tees and the Humber, was added in 560, and under the descendants of Egbert of Wessex the gradual union of England took place, this movement occurring between the close of the 8th century and the Norman conquest.

NORTHWESTER, the name of a warm wind common to the Southern Hemisphere, similar to the Chinook in Canada and the United States. The northwesters have their source near the Tropic of Capricorn and blow from the northwest, sweeping over New Zealand and the southern part of South America. They are particularly valuable to the southern part of Chile and Argentina, where they have a favorable influence upon the climate.

NORTHWESTERN UNIVERSITY, a co-educational institution of higher learning at Evanston and Chicago, Ill., established in 1851, under the patronage of the Methodist Episcopal Church. Admission is on an equal basis to all applicants on an examination, or on certificate from accredited schools. The university comprises the schools of law, medicine, dentistry, commerce, and journalism, in Chicago, and the college of liberal arts and the schools of music, speech, commerce, journalism, education, the graduate school of arts and sciences, the college of engineering, and the department of domestic science at Evanston. The Norwegian-Danish Theological School, the Swedish Theological Seminary, and the Garrett Biblical Institute, all at Evanston, maintain close relations with the university. It has an endowment of $15,000,000, property valued at $12,000,000, and a library of 250,000 volumes and pamphlets. The university has 700 instructors and 10,500 students.

NORTHWEST TERRITORIES, the name applied to a large part of British North America. Formerly it included all the possessions of Great Britain in North America, except the region which was included in Newfoundland and the provinces of the Dominion of Canada. However, the Northwest Territories as at present organized under the laws of 1912, include only the districts of Franklin and Mackenzie. The area is estimated at 1,256,000 square miles. Ottawa, the capital of the Dominion, is the seat of government. The population in 1911 was 16,951, most of whom were Eskimos.

The climate is cold and severe. In the northern part the soil is frozen almost the entire year. but the country some distance inland has fine forests and considerable mineral wealth. Lichen and mosses are the principal vegetable forms in the Arctic regions.

NORTH YAKIMA (now Yakima), county seat of Yakima Co., Wash., on the Yakima River and on the Northern Pacific and other railways. It is in a rich farming region and has a large trade in fruit, hops, hay, grain, and live stock. The chief buildings include the courthouse, Y. M. C. A., high school, public library, federal building, and many fine churches and business blocks. It has a brisk wholesale trade, sanitary sewers, paving, and electric lights and railways. It was settled in 1886 and incorporated in 1889. Population, 1920, 18,539.

NORTHWEST TERRITORY, the former name of a large region in the United States. It is located west of Pennsylvania, south of the Great Lakes, east of the Mississippi, and north of the Ohio. At present it includes the states of Ohio, Michigan, Wisconsin, Illinois, Indiana, and part of Minnesota. The area is about 265,878 square miles. At the time of the Revolution it was claimed through charters and other grants by Connecticut, Massachusetts, New York, and Virginia. The claims of these states were not recognized at the time the Declaration of Independence was issued and Congress, in 1780, pledged that the lands would be divided so as to form new states, hence the four states making claims ceded their rights. New York relinquished its claims in 1781; Virginia, in 1784; Massachusetts, in 1785; and Connecticut, in 1786. However, certain lands were reserved by these colonies for special purposes, as the Virginia Military District and the (Connecticut) Western Reserve, both in Ohio.

Thomas Jefferson proposed a plan of government for this region and Congress adopted it in 1784, but it was repealed and superseded by the Ordinance of 1787, when General Arthur Saint Claire was made Governor. The land having been thrown open for sale and settlement, a great influx of immigrants from the states farther east and from Europe founded homes. Ohio was set off and made a State in 1803 and the western part was organized as the District of Indiana in 1800, with William Henry Harrison as Governor. Michigan was made a Territory in 1785; Illinois, in 1809; Wisconsin, in 1836; and Minnesota, 1849, being formed partly from the Northwest Territory and partly from the Louisiana Purchase.

NORTON (nôr'tŭn), **Charles Eliot,** author and critic, born in Cambridge, Mass., Nov. 16, 1827, died Oct. 21, 1908. He graduated at Harvard in 1846 and soon after took up a business career in Boston. In 1849 he traveled in India and Europe and, on returning to America, took up literary work. During the Civil War he assisted in editing papers and pamphlets favorable to the Federals and for some time was connected

with James Russell Lowell, as editor of the *North American Review*. In 1875 he was made professor of the history of art at Harvard, where he exercised a wide influence upon the art and culture of America. Degrees and other distinctions were conferred upon him by several European institutions, including the University of Cambridge. Several prominent men of letters retained him as literary editor, among them Ruskin, Lowell, Emerson, Carlyle, and G. W. Curtis. His books include "Notes of Travel and Study in Italy," "The Heart of Oak Books," "Correspondence Between Goethe and Carlyle," "A Translation of Dante's Divina Comedia," and "Consideration of Some Recent Social Theories."

NORWALK (nôr'wąk), a city of Connecticut, in Fairfield County, on the Norwalk River and Long Island Sound, fourteen miles southwest of Bridgeport. It is on the New York, New Haven and Hartford Railroad and is noted as a summer resort. The chief buildings include the Carnegie Library, the State Armory, the high school, the Norwalk Hospital, and a home for children. It has many municipal facilities, including waterworks, pavements, and street railways. The manufactures include straw and felt hats, boots and shoes, cotton and woolen goods, machinery, musical instruments, flour, and paper boxes. It was settled in 1649 and incorporated as a town in 1651. The British burned it in 1779. It was chartered as a city in 1893. Population, 1900, 6,125; in 1920, 27,557.

NORWALK, a city of Ohio, county seat of Huron County, sixteen miles southeast of Sandusky. It is on the Wheeling and Lake Erie and the Lake Shore and Michigan Southern railroads. The surrounding country is farming and dairying. It has a public library, the county courthouse, and many schools and churches. The manufactures include hardware, tobacco, musical instruments, farming implements, flour, cigars, woodwork, brick, and machinery. It is supplied with modern facilities, including electric lights, pavements, waterworks, and sanitary sewerage. Norwalk was settled in 1817 and became a city in 1881. Population, 1920, 7,379.

NORWAY (nôr'wā), an independent kingdom of Europe, occupying the western portion of the Scandinavian peninsula. It is separated from Sweden by the Kiolen Mountains, which continue southward toward the Skager Rack in the form of a sloping tableland. The western boundary is formed by the North Sea and the Atlantic Ocean; the northern, by the Arctic Ocean; the eastern, by Russia and Sweden; and the southern, by the North Sea and the Skager Rack. It extends north and south for a distance of 1,075 miles and has a width of from 50 to 275 miles. The area is 124,129 square miles.

DESCRIPTION. The coast is indented by numerous bays, or *fiords,* that have rocky and precipitous shores. Hundreds of islands lie near the mainland. Off the northwestern shore are the Lofoden Isles, separated mainly from the continent by West Fiord. The general surface is a rugged plateau, with deep-cut valleys and groups of hills and mountains which rise above the general level. In the southeastern and central parts are forests of pine, fir, birch, and other valuable woods. Vast glaciers and snow fields characterize the northern part. Three mountain ranges diversify the surface, including the Dovrefield in the central part, the Langfield in the south, and the Kiolen on the frontier of Sweden. Most of the mountain regions assume the form of tablelands, called *fields,* and they are characterized by extensive fiords. Among the highest summits are Lodalskaupen, 6,785 feet; Snehaetten, 7,570 feet; and Klittertind, 8,380 feet.

Norway has few large rivers, owing to the narrowness of the country, and the drainage is chiefly toward the south and southeast. The Glommen, in the southeast, has the largest basin and drains into Christiania Fiord, an extension of the Skager Rack. Other rivers of the southern part include the Laugen, Nisser, and Otter, all flowing into the Skager Rack. The central part is drained chiefly by the Orka and the Namsen into the Atlantic. The Tana flows into Tana Fiord, an inlet from the Arctic Ocean, and forms part of the boundary between Norway and Russia. Many beautiful waterfalls and lakes characterize the scenery. Miösen is the largest lake, area 140 square miles, and is about 60 miles long and 1,500 feet deep. The lakes are principally in long and deep valleys and lie about 400 feet above sea level. They include lakes Kröderen, Randsfiord, and Spirilen. Animals common to cold countries are met in large numbers in the northern section, such as the deer, lynx, wolf, bear, and reindeer. Birds of prey and song are quite numerous and many species of waterfowl are found. Among the common birds are the starling, falcon, woodchuck, blackbird, goose, and duck.

The climate varies greatly in different sections, owing chiefly to the extent in latitude. Norway extends about 300 miles into the Arctic Zone and fully one-third is in the region of the midnight sun. In winter the days are short and dark, but they are unusually bright and long during the summer. In the southern part the shortest day is about six hours and the longest is about eighteen hours. The western coast has a somewhat more favorable climate than the interior, owing to the effect of the sea, and the coldest region is in the central part. In the southern part the mean annual temperature is 45°, the extremes ranging from 10° below zero to 92° above. Rainfall varies greatly, ranging from twelve inches in the highlands of the north to eighty inches along the southwestern coast. At Grimstad, in the southeastern part, it is 47 inches. As a whole the climate is brisk and healthful, favorable to the development of a strong and energetic people.

MINING. Norway is rich in mineral resources

and mining is one of the leading industries. At Kongsberg are rich silver mines, which are owned by the government, and these have been worked by the state nearly three centuries. Copper of a high grade is obtained in the vicinity of Röros and iron ores and silver quartz occur in many places. The only coal fields are on the island of Andö. Marble and granite of a fine quality for monuments and building purposes are widely distributed and much of the output is exported. Other minerals include nickel, sulphur, cobalt, slate, soapstone, and feldspar.

Fisheries. Norway has taken high rank in the fishing industry for many centuries. The value of the annual output of fish, both fresh and cured, approximates $14,750,000. The coast fisheries yield the larger returns, but sealing, whaling, and deep-sea fishing are carried on to a considerable extent. Cod fisheries are especially productive in the region of the Lofoden Isles, where the annual catch of this class of fishes approximates 35,000,000. Herring are caught in large numbers. Other catches include those of the mackerel, salmon, and lobster.

Agriculture. The country is not rich in soil, about sixty per cent. being mountainous and bare, and only ten per cent. is utilized for cultivation. About one-fifth of the total area is covered with forests. Rye is the staple cereal and is grown farther north than oats or barley, though the latter yields good returns as far north as 70° of latitude. Wheat and oats are not grown north of the Trondhiem Fiord. Potatoes are cultivated to a large extent and take rank with rye as a staple food product. The yield of cereals and root crops compares favorably with that of other countries in Europe, owing to heavy manuring and careful cultivation of the soil. Small fruits of all kinds thrive.

The pastures in the southern part are exceptionally productive. Grazing is good in the central plateau, where sheep raising receives considerable attention. Cattle are grown both for meat and dairying, and the grades are of a small kind suitable for milking. Dairying is carried on principally by the coöperative plan, the milk being conveyed to central plants from the farms. Two types of horses are grown, a small grade for driving and a larger species for farm and draft purposes. Other domestic animals include goats, swine, reindeer, and poultry. The livestock industry requires warm barns for shelter during the winter, when all animal food is housed, and during the summer young stock is usually driven or shipped north for pasturing.

Manufactures. Many materials for manufacturing are obtained within the country, though the supply of coal is imported to a large extent. Salted and dried fish and cod-liver oil are prepared in large quantities. Lumber products make up nearly one-third of the manufactures, including furniture, barrels, and finishing lumber. Christiania has large shipyards, machine shops, and mills for spinning and weaving. Paper is made extensively from wood pulp obtained at the mills, and tanneries and flour mills are distributed throughout the country. Other manufactures include tobacco and cigars, spirituous liquors, matches, sugar, pottery, hardware, and clothing. In the manufacture of lucifer matches, silk textiles, leather, and cordage the country takes high rank.

Transportation and Commerce. Norway has a coast line of about 12,000 miles. This estimate includes the fiords and large islands. From an early date in history the Norwegians have ranked as a race of sailors, and the merchant marine holds fourth rank in the world at present. Though the portable resources of Norway are not large, vessels carrying the Norwegian flag are manifest in all the seas, and are particularly numerous in carrying trade between the United States and South America. Railroad building is confined to the southern part and the lines aggregate a total of 1,950 miles, nearly all of which are owned and operated by the government. Electric railways are operated in the cities and in the more densely populated rural districts. The highways are in a well-improved condition. Coal, oils, linseed, locomotives, and machinery are imported. The exports consist principally of timber, fish, wood pulp, and agricultural products. Great Britain, Germany, Sweden, and Russia have the largest share of the trade.

Education. An efficient system of public schools is maintained, at which attendance is free and compulsory between the ages of seven and fourteen years. A large number of secondary schools are supported in the towns and cities, in which higher courses of instruction are given. Illiteracy has been almost entirely overcome through the efficient work of private and public schools, and a high class of teaching efficiency is insured through the maintenance of ten normal schools. The educational work culminates in the Royal Frederick University at Christiania, which has an enrollment of 1,500 students.

Government. Norway was united to Sweden in 1815 and until 1905 the government was vested in the same king, but each had a separate legislature and system of courts. It is now an independent constitutional monarchy and the succession is in the male line, but the *Storthing* has the right to choose a successor in case there is no direct male descendant. The legislative branch is known as the *Storthing,* which consists of two chambers, the *Lagthing* and the *Odelsthing,* the former consisting of one-fourth of the whole number and the latter of the remaining three-fourths. All members of the *Storthing,* a total of 123, are elected by popular vote for three years. The right of suffrage is vested in all who have paid their taxes the past year without distinction of sex. Local government is administered by counties, twenty in number, the chief officer of which is called the *amtmana.* The militia, or *landvoern,* constitutes the principal portion of the army, and the *landstorm* in-

cludes those liable to service in times of war, all of the members being subject to a brief service as a means to develop military efficiency. All men over 22 years of age are included in the compulsory military service in the time of war.

INHABITANTS. Norway is the most thinly populated country in Europe, having only 18 inhabitants to the square mile, and fully two-thirds live in the south. Though all religions are tolerated, nearly the entire population is included in the Lutheran Church. The dissenters number about 52,750, including 10,289 Methodists. Oslo, in the southeastern part, is the capital and largest city. Other important cities include Bergen, Trondhjem, Stavanger, Drammen, and Frederikstad. In 1920 the population was 2,692,698.

LANGUAGE AND LITERATURE. The language of Norway is more closely associated with that of Denmark than that of Sweden, though it has a considerable similarity to the latter. It is very similar to the language spoken in Iceland, with which it constitutes the West Norse branch of the Scandinavian group. The literature is rich in history, poetry, astronomy, botany, geography, and religion, and is closely associated with that of the other Scandinavian countries. Many of the early writings are interwoven with the "Edda," an early production containing legendary verses of heroes and gods. Among the noted literary products are the "Sagas," in which are included accounts of the conversion of the Scandinavian peoples to Christianity. "The Chronicle of Norwegian Kings" is one of the numerous early literary productions. During the middle period much inspiration was drawn from the literature and language of the Danes. The Norwegian writers of ability belong distinctly to later times and include Wergeland, Monsen, Welhaven, Garborg, Björnson, Absjörsen, Ibsen, and others. See **Sweden.**

HISTORY. The history of Norway is closely associated with that of Sweden and Lapland. At the dawn of the historical period of Western Europe the Norwegians were governed by various chiefs and kings. At an early date they were associated with the Northmen. They were noted particularly for great skill in maritime service and acquired a reputation as piratical conquerors of the sea. In the latter part of the 9th century they were governed by Harald Fairhair, who was succeeded by his son, Eric, in 933, but the latter was deposed by his brother, Hako I., in 938. Hako I. became converted to Christianity. He was succeeded by other sovereigns who gave support to the spread of that faith, and in 1042 the ruling sovereign united Denmark to his domain. In 1066 many Norwegians took part with the Northmen of France in conquering England.

In 1319 Norway and Sweden became united under Magnus V., and in 1397 Eric of Pomerania was crowned King of Norway, Denmark, and Sweden. Subsequently many wars preyed upon its people and resources, and, after the defeat of Napoleon in 1814, Norway was united by the Treaty of Vienna with Sweden. Some friction resulted in efforts to unify the governmental institutions of Norway and Sweden for the reason that the constitution of Norway is democratic in character, and in 1821 all titles of nobility were abolished. In June, 1905, the *Storthing* declared Norway an independent state and refused to give further allegiance to the King of Sweden.

The dissolution between Norway and Sweden may be said to date from Aug. 13, 1905, when a referendum vote was taken in Norway to test the sentiment of the people. On the proposition of separation 368,200 voted yes and only 184 voted no. Immediately four commissioners were appointed for each country to negotiate the conditions of the dissolution of the union. The commissioners met at Karlsbad and after protracted negotiations reached an agreement on Sept. 23. This provided that all disputes not involving matters of vital interest be arbitrated before The Hague tribunal, and a neutral zone was fixed between the two countries. The treaty was ratified by the *Storthing* of Norway on Oct. 10 and by the *Rigsdag* of Sweden on Oct. 13. It was proposed to place on the throne of Norway a son of King Oscar, but the King of Sweden refused to allow one of his sons to accept, and Prince Charles of Denmark was elected king by popular vote. He accepted the throne as Haakon VII. (q. v.). Those voting against him favored the establishment of a republic.

NORWICH (nôr'wĭch), a city of Connecticut, county seat of New London County, on the Thames River, 92 miles southwest of Boston. It is on the Vermont Central and on the New York, New Haven and Hartford railroads. The site occupies hilly ground in the valley of the Yantic and the Shetucket, which here form the Thames. It has communication by steamboats and electric railways. The noteworthy buildings include the county courthouse, the Otis Library, the Y. M. C. A. building, the Backus Hospital, the Free Academy, and the Church of Saint Patrick. It has manufactures of cotton and woolen goods, flour, paper, leather, cutlery, bicycles, hardware, type, cordage, machinery and furniture. The site was purchased from a Mohican Indian chief in 1656 and the town was founded in 1659. It was chartered as a city in 1784. Population, 1900, 17,251; in 1920, 27,557.

NORWICH, county seat of Chenango County, New York, on the Chenango River, 42 miles northeast of Binghamton. It is on the New York, Ontario and Western and the Delaware, Lackawanna and Western railroads. The place is surrounded by a productive farming and dairying country and has many excellent municipal facilities. Among the manufactures are textiles, lumber products, furniture, machinery, tile, bread, and leather goods. The principal buildings include the county courthouse, the high school, and the public library. It has a fine railway depot and railroad shops. Population, 1900, 5,766; in 1925, 8,345.

NORWICH, a city of England, capital of Norfolk County, 98 miles northeast of London. It is surrounded by a fertile agricultural and dairying country and has several important railway lines. The manufactures include mustard, starch, boots and shoes, clothing, vinegar, machinery, ironware, and farming machinery. Among the noteworthy buildings are the public library, the townhall, the county courthouse, the central railway station, and the free grammar school. It is the seat of a number of fine schools, many churches, and a cathedral of the Norman style founded in 1095, which has a spire 315 feet high. The city was founded about 446, was several times occupied by the Danes, and by the 11th century attained to commercial importance. It has sent representatives to Parliament since 1296 and was the seat of 66 bishops. The city has been materially improved within recent years and has a large trade. Population, 1921, 121,493.

NORWOOD (nôr'wo͝od), a town of Massachusetts, in Norfolk County, twelve miles southwest of Boston, with which it is connected by the New York, New Haven and Hartford Railroad. It has waterworks and electric lighting and contains the Morrill Library with 12,000 volumes. The manufactures include leather, glue and ink, ironware, and machinery. It is the residence of many Boston business men. Population, 1905, 6,731; in 1925, 14,151.

NORWOOD, a city of Ohio, in Hamilton County, a short distance from Cincinnati. It is on the line of the Norfolk and Western, the Baltimore and Ohio Southwestern, and other railways. The city owns and operates the waterworks and electric light plant. It is a favorite residence suburb of Cincinnati business men and may be reached by interurban and electric trains. Among the manufactures are pianos, furniture, machinery, electrical apparatus, paper bags, and clothing. The first settlement on its site was established in 1790 and it was incorporated as a city in 1902. Population, 1920, 24,966.

NOSE, that part of the face of man and of the higher animals which contains the nostrils and the organ of smell. In man the nose projects as a triangular pyramid from the center of the face, above the upper lip. It consists of the external and internal parts, the latter being formed of the nostrils, two cavities divided by an upright wall, called the *nasal septum.* The nose is composed of cartilage covered with muscle and skin and is joined to the skull by two small bones, the vomer and the turbinate bone. The nostrils are lined by a continuation of the mucous membrane of the throat and open at the back into the pharynx. At the roof of the nose is a long, sievelike plate, through which the fibers of the *olfactory nerve* enter, and this nerve, ascending to the brain, gives rise to the sensation of smell. Odorous particles need not enter the nose to produce smell impulses, but must be conveyed to the membrane by the air or by some other gaseous medium. The smell impulses are more intense when the odorous air is drawn up higher into the nasal passages, for the reason that they then affect a greater surface. The nasal passages are concerned in the production of voice and serve in the function of breathing. Small hairs are usually abundant in the nostrils. They serve to prevent dust particles entering in breathing.

NOSE.

A, b, c, d, interior of the nose, which is lined by a mucous membrane; *n,* the nose; *e,* the wing of the nose; *q,* the nose bones; *o,* the upper lip; *g,* section of the upper jawbone; *h,* the upper part of the mouth, or hard palate; *m,* frontal bone of the skull; *k,* the ganglion or bulb of the olfactory nerve in the skull, from which are seen the branches of the nerve passing in all directions.

NOTARY (nō'tȧ-rў), or **Notary Public,** an officer appointed to draw up and attest deeds, contracts, and other legal documents. The name and office is of Roman origin, but the *notarii* of ancient Rome were private shorthand writers instead of public officers. At present the functions of a notary public vary somewhat in different countries. In Great Britain and the United States they are appointive, both male and female citizens being eligible in most of the states, and in some cases they are required to give bonds as a guarantee of faithful service. In general they have power to take acknowledgments of legal documents, as deeds and mortgages, and in addition take affidavits and protest commercial paper. The official power or authority of a notary cannot be transferred to another, but his official acts must in general be performed personally. In most countries a notary has a seal, which is required to be impressed upon the document, and in most cases it must be stated when the notarial commission expires.

NOTATION AND NUMERATION, two common terms employed in arithmetic. The former designates a system of figures or characters used to represent numbers, and the act of recording them; while the latter is employed to express the art of reading numbers when they

are expressed by numerals. The numerical symbols used in notation are known as the *Arabic* and the *Roman*. However, the so-called Arabic system was originated by the Hindus and came to us through the Arabs, hence the name. The principal characters up to one million are relatively as follows: Arabic 1, Roman I; 2, II; 3, III; 4, IV; 5, V; 6, VI; 7, VII; 8, VIII; 9, IX; 10, X; 11, XI; 12, XII; 13, XIII; 14, XIV; 15, XV; 16, XVI; 17, XVII; 18, XVIII; 19, XIX; 20, XX; 30, XXX; 40, XL; 50, L; 60, LX; 70, LXX; 80, LXXX; 90, XC; 100, C; 500, D; 1,000, M; 1,000,000, M̄. The names applied to the different denominations include the following: unit, ten, hundred, thousand, million, billion, trillion, quadrillion, quintillion, sextillion, septillion, octillion, nonillion, decillion, etc.

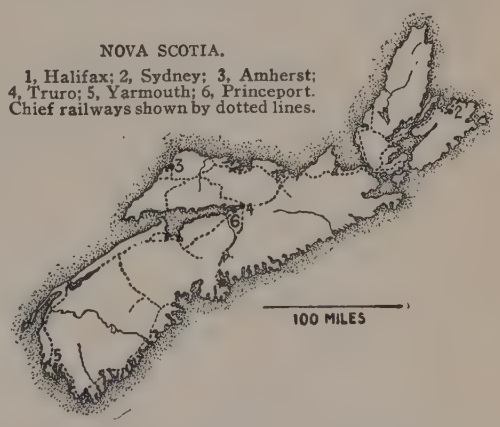
NOTRE DAME (nō'tr' dām), **Cathedral of,** a celebrated church in Paris, France, dedicated to the Virgin Mary. It occupies a fine site on the Ile de la Cité, where formerly stood a temple of Jupiter Cernăunus, and was built in the 13th century. The architecture is in the Gothic style and is crowned with two massive towers. The length of the cathedral is 330 feet; width, 170 feet; and height of towers, 223 feet. It was converted into a Temple of Reason at the time of the French Revolution, when the goddess of reason replaced the statue of the Virgin. Victor Hugo directed attention to it by his literary work entitled "Notra Dame de Paris," in 1830, and soon after the edifice was greatly improved.

NOTRE DAME, University of, an educational institution of higher learning at Notre Dame, Ind., established under the auspices of the Roman Catholic Church in 1842. It is one of the largest and most important universities of its class in the United States. The courses embrace law, sciences, mathematics, fine arts, and the classics. Special advantages are provided for the teaching of mechanical engineering, applied electricity, telegraphy, pharmacy, architecture, and typewriting. The library contains 130,000 volumes and the college property is valued at $2,750,000. It has a faculty of 142 instructors and an attendance of 3,200 students.

NOTTINGHAM (nŏt'tĭng-ạm), a city of England, capital of Nottingham County, on the Trent River, 118 miles northwest of London. It occupies a fine site in a fertile region, has extensive railroad facilities, and is the center of a large commercial and manufacturing trade. The older streets are narrow and irregular, but the newer part of the city is spacious and contains many large business blocks and residences. It has extensive manufactures of cotton and woolen textiles, lace, needles, hosiery, tobacco products, machinery, furniture, chemicals, and hardware. The city has a number of fine educational institutions, including the Mechanics' Institute, the University College, the Congregational Institute, the free grammar school, and the Nottingham School of Art, a fine structure in the Italian style erected in 1865. It is the seat of several benevolent institutions, many fine churches, and the Roman Catholic Cathedral of Saint Barnabas. It has a free museum of natural history, many hospitals, and a free public library of 100,000 volumes. The city is supplied with electric and gas lighting, street railways, pavements, public parks, waterworks, public markets, and municipally owned baths and cemeteries. It was founded in the early Anglo-Saxon occupation of England and was held by the Danes until 868. In 1643 it was taken from Charles I. by the Parliamentarians. Population, 1921, 259,942.

NOUN, one of the parts of speech, a word used as the name of anything, quality, action, or other entity. A noun is said to be *proper* when it is the name of a particular person or thing and *common* when it refers to any one of a class of objects. *Class nouns* are names that refer to any individual of a class, as horse; *collective nouns* are singular in form but denote more than one, as assembly; and *verbal nouns* denote the name of an action, as singing. A noun that denotes a quality considered apart from the object in which it is found, as brightness, is called an *abstract noun.* The properties of the noun are *gender, person, number* and *case.*

NOVA SCOTIA (nō'vȧ skō'shĭ-ȧ), a Province of the Dominion of Canada, consisting of the island of Cape Breton and the peninsula of Nova Scotia. The two are separated by the



Strait of Canso, which connects the Saint Georges Bay with the Atlantic Ocean. The peninsula of Nova Scotia is bounded on the north by New Brunswick, Northumberland Strait, and the Gulf of Saint Lawrence, northeast by the Strait of Canso, south and west by the Atlantic, and northwest by the Bay of Fundy and New Brunswick. Cape Breton Island lies northeast of Nova Scotia and its boundaries are formed mainly by the Atlantic and the Gulf of Saint Lawrence. Sable Island, located east of Nova Scotia, is a part of the Province. The area is 21,248 square miles.

DESCRIPTION. A number of indentations char-

acterize the coast, which in many places is high and rocky. The surface is undulating, sloping gradually toward the southwest, and the highlands form a continuation of the Appalachian system. Along the Atlantic coast are the highlands that form the principal watershed and along the Bay of Fundy trend the North Mountains. North of the Minas Basin, an inlet from the Bay of Fundy, is a range known as the Cobequid Mountains. The highlands range from 600 to 1,000 feet above the sea and within this region are many fertile valleys.

The drainage is chiefly toward the south by numerous short rivers. In the southwestern part is the Annapolis River, which flows mainly between two ranges of hills along the Bay of Fundy and discharges in the Annapolis Basin. Saint Mary's River, in the southeastern part, flows into the Atlantic. All the streams of Cape Breton Island are short and unimportant, but it has many fine lakes, including Bras D'Or Lake, which has connection with Saint Peter's Bay. All of the coasts are indented by numerous inlets, including Saint Mary Bay, Minas Basin, Saint George's Bay, Chedabucto Bay, and Saint Margaret Bay, in Nova Scotia, and Aspy Bay, Saint Ann Bay, and Saint Peter's Bay, in Cape Breton Island.

The location of Nova Scotia gives it a more equable climate than any other Province of Canada, being influenced by breezes and currents from the ocean. Its southern coast is tempered by the Gulf Stream, which produces a modifying effect upon the severity of the winters, but the Province has an unusual amount of mild and pleasant weather. The summers are mild and the winters are not intensely cold. At Halifax the thermometer seldom falls below zero and the extreme of summer is about 86°. An abundance of rainfall occurs in all parts of the Province, the average being about 45 inches. Extensive and valuable forests abound, including spruce, balsam, tamarack, beech, willow, cotton wood, elm, and maple.

Mining. The minerals are abundant and valuable. Coal seams of great thickness underlie the northern part, where a superior quality of the bituminous variety is obtained. This product is exported to various parts of Canada and the New England states. The annual output of coal is placed at 3,000,000 tons. Gold is mined profitably on the Atlantic side of Nova Scotia and Cape Breton Island, and iron ore of excellent quality is found throughout the Province. About half of all the gypsum produced in Canada is obtained in Nova Scotia. Granite and limestone for building purposes are abundant. Other minerals include copper, silver, lead, tin, and petroleum.

Agriculture. About one-half of the entire surface is susceptible to cultivation, and the lowlands along the streams and inner shores are exceptionally fertile. Oats, potatoes, hay, barley, buckwheat, and fruits are the principal crops. Large quantities of fruit, especially apples, are raised for export in the Annapolis and Cornwallis valleys. The hilly country is generally rocky and not well adapted to farming, but it furnishes excellent grazing. Cattle are the principal domestic animals and they are grown both for the butcher and for dairy purposes. Horses, sheep, and poultry are grown extensively for domestic use and exportation.

Manufactures. The Province has an immense store of coal and iron ore, hence is abundantly supplied with material for the production of large quantities of iron and steel. Tanning bark is obtained in the forests and the industry of tanning is well established. Halifax has plants for the manufacture of beet sugar and cotton and woolen fabrics. The forests yield large quantities of valuable lumber, the output being partly exported and partly used in the manufacture of furniture and machinery. Large quantities of fish are cured or canned, especially cod, herring, mackerel, and lobster. These fisheries have been important from the early discovery of America. However, the output of cured and canned cod and lobster surpasses all others in importance.

Transportation and Commerce. Nova Scotia is situated favorably for a large maritime commerce, having an extensive coast and many safe harbors. A line of the Canadian National Railway extends the length of the Province, with terminals at Halifax, North Sidney, Pugwash, and Pictou Landing. Direct connection is provided by a line to Chaleur Bay, in New Brunswick, and to Montreal. The total lines include 1,400 miles. Navigation is secured against dangers by a large number of lighthouses and fog alarms, these being necessary on account of dense fogs that prevail at different seasons of the year. Commercial relations are maintained with the leading countries of the world, although the principal markets are those of Great Britain, the United States, the West Indies, and Brazil. Coal, fish, lumber, and dairy products are the principal exports, while the imports include textiles, tea and coffee, clothing and machinery.

Government. The Lieutenant Governor of Nova Scotia is appointed by the Governor General of the Dominion and is assisted by an executive council of eight members. The Legislature consists of two chambers, the legislative council of 18 appointive members and the house of assembly of 43 elective members. A large part of the public revenues is obtained from leases and royalties in connection with the mines and, in addition, a subsidy is paid by the Dominion. Local government is administered by the county and municipal officers.

Education. The public schools of Nova Scotia are classified in twelve grades, of which eight are common school and four are high school grades. About 116,000 pupils are in attendance upon these schools, of which number nearly nine per cent. are in the high schools. Practically all of the public school teachers have had the ad-

vantage of efficient normal training. Ample facilities are provided for teaching military tactics and mechanical and domestic sciences. Each county has a high school, located usually in the shire town, and it is open to all in the county who can pass the examination, in consideration of an extra grant called the *County Academy Grant,* and these free high schools are known as the *County Academies.* All the high schools are free to those residing in the school section, which may be a city, town, or rural district, and the area of the last mentioned is normally about four square miles. Support for public instruction is obtained by municipal and provincial grants and local assessment. Attendance upon the schools is free in all grades and compulsory up to the seventh grade.

Dalhousie University, in Halifax, is at the head of public education. It has faculties of art, science, law, medicine, dentistry, pharmacy, mining, and civil engineering and is attended by about 400 students. The provincial normal school is at Truro; the provincial technical college, at Halifax; and the provincial agricultural college at Truro. A council of public instruction of eight members has general charge of educational work and the administration is chiefly through the superintendent of education, who is secretary of the council of public instruction. Local supervision in the towns and counties is by inspectors. Many private and denominational institutions are maintained. These include Kings College (Episcopalian), Halifax; Acadia College (Baptist), Wolfville; Saint Francis Xavier College (Scotch Catholic), Antigonish; Saint Mary's College (Irish Catholic), Halifax; Presbyterian College, Pinehill; and College Ste. Anne (French Catholic), Church Point.

INHABITANTS. The density of population is 22 persons to the square mile. A large majority of the people are of British origin, but the Scotch are most numerous. About one-third of the inhabitants are Roman Catholics, and the remainder are largely Presbyterians, Baptists, Episcopalians, and Methodists. Although the public schools are undenominational, a large number of parochial institutions are maintained. Halifax, in the south part of Nova Scotia Island, is the capital and largest city. Other cities include Sydney, Amherst, Truro, Yarmouth, Pictou, Lunenburg, Spring Hill, and Stellarton. In 1901 the population was 459,574, including 2,125 Indians. Population, 1921, 523,837.

NOVA ZEMBLA (nō'vȧ zĕm'blȧ), an island which belongs to Russia, situated between the Arctic Ocean and the Kara Sea. It is separated from Vaigatch Island by Kara Strait and is divided into two parts by Matotchkin Strait. The length is 625 miles; breadth, 75 miles; and estimated area, 40,500 square miles. Nova Zembla was known to the hunters of Novgorod in the 11th century, but definite knowledge was not accumulated until in the last century, when surveys were made and published. The climate is colder than that of Spitzbergen, for the reason that the latter is affected by oceanic currents to a much greater extent, and the vegetation consists largely of stunted shrubs, lichens, and various short grasses. Vast flocks of wild fowl frequent the shores in summer and autumn, and there are abundant whale, seal, and dolphin fisheries. It is frequented by the bear, ice fox, lemming, and reindeer, but insect life is very limited. A few scattered settlers live in the southern part. During the milder season of the year large numbers of Russian hunters and fishers frequent the different islands and the shores.

NOVELLO (nō-vĕl'lō), **Joseph Alfred,** organist and composer, born in London, England, in 1810; died in Genoa, Italy, July 17, 1896. He was the son of Vincent Novello, a German musician born in 1781. The son became a musical publisher at the age of nineteen years and formed the friendship of Felix Mendelssohn. Later he aided Bessemer in producing Bessemer steel, and in 1856 retired from business and settled in Italy. His publishing house issued many standard compositions, including Hadyn's "Creation" and Handel's "Messiah." He wrote "Epistle on Naval Architecture," a publication devoted to the construction of ships.

NOVELS, the name applied to fictitious tales, usually written in prose, based on a plot of greater or less intricacy. They portray representations from real life, especially emotional periods in the lives of the persons depicted. A novel differs from an epic in that the latter deals with ordinary characters and actions, and from romance in that it professes to represent things from real life, while romance appeals to the mysterious, supernatural, and heroic. Novels were written for entertainment in an early period. The first known are the "Milesian Tales," none of which are now extant. These writings are attributed to Aristides, a member of an Ionic Grecian colony in Asia Minor, known as Milesia, which was conquered by the Persians in 494 B. C. Later both novels and romances became popular among the Greeks and Romans. Modern novel writing dates from the early part of the 14th century, the first being in the stories of Giovanni Boccaccio, who published the finest in point of style and sentiment in his "Decameron" in 1358. Later appeared many novels. They were inspired largely by this work and partly by "Il Novelino," one of the celebrated productions of Italian masters that appeared rather as a compilation than an original work near the close of the 13th century.

Excellent novels soon after developed in the literature of all leading countries. By the early part of the 17th century each of the principal languages of Europe had incorporated prose fiction as a representative type in the recognized literature. Writers multiplied in the 18th and 19th centuries. The nations which have a literature at all include among their writers a number

of celebrated novelists. The leading American novelists include Washington Irving, J. Fenimore Cooper, Oliver Wendell Holmes, Nathaniel Hawthorne, Edgar A. Poe, Harriet Beecher Stowe, Brockden Brown, W. D. Howells, Bret Harte, W. G. Simms, and Henry James. Among the English writers of novels may be mentioned Sir Walter Scott, Bulwer-Lytton, George Eliot, Walter Besant, Charles Dickens, Rider Haggard, Wm. M. Thackeray, and Thomas Hughes; among the German, Wilibald Alexis, Gustaf Freytag, Georg Ebers, Gottfried and Johanna Kinkel, and G. zu Putlitz; among the French, Victor Hugo, George Sand, Alphonse Karr, Prosper Mérimée, Daudet, and Zola.

NOVEMBER (nō-vĕm'bĕr), the eleventh month of our year, but the ninth in the Julian calendar. It was one of the ten months of the year of Romulus, consisting of thirty days, which number was afterward changed to 29 by the decemvirs. Julius Caesar gave it 31 days, but Augustus restored it to its original 30 days, which is the number at present. See **Months.**

NOVGOROD (nôv'gŏ-rôt), or **Novgorod-Veliki,** a city of Russia, capital of a government of the same name, on the Volkhov River, 115 miles south of Saint Petersburg. It is conveniently connected by railways, but is of interest mainly because of its importance as a seat of Russian influence in the early history of Europe. Novgorod was the most important city of Northern Europe in the 12th century, when it had a population of 400,000 and maintained a form of government largely republican in character. It may be considered the nucleus around which grew Russian influence, since the history of that country commenced when the Norman prince, Rurik, began his reign, in 862, over the tribes resident in and around Novgorod. In 1862 a great monument was erected here by the Russian government to commemorate the thousandth anniversary of that event. Its decline began in 1471, when Ivan III. destroyed a part of the city, and it was further injured by the opening of the port at Archangel and the founding of Saint Petersburg. The Church of Saint Sofia, founded in the 11th century, is its most noteworthy building, but it has several other fine churches, a number of schools, and manufactures of clothing, machinery, spirituous liquors, and utensils. Waterworks, pavements, and street railways are among the improvements. It is the center of considerable trade in hemp, flax, and cereals. Population, 1922, 28,108.

NOVUM ORGANUM, meaning new instrument, the name of Francis Bacon's great literary work, treating of the proper method of studying nature. In this work the author points out what he deems vain and useless speculations of ancient philosophers and directs the minds of man to the pursuit of the practical and useful. It was instrumental in developing the modern inductive method of proceeding from particular facts to general laws, instead of inferring facts from vague and insufficiently proven laws. No book excelled it in revolutionizing the mode of thinking, in overthrowing many prejudices, and introducing new opinions.

N-RAYS, the name applied to peculiar rays of light discovered at the University of Nance, France, while Professor Blondlot was experimenting with X-rays. These rays penetrate most substances, although others are impenetrable by them, such as water, platinum, and salt rock. Substances through which they penetrate readily, such as thin fabrics, are made opaque to them when saturated with water. These rays exist in sunlight in a dry atmosphere, but do not penetrate the air when it is moistened with fogs or clouds.

NUBAR PASHA (nōō'bär pä-shä'), Egyptian statesman, born in Smyrna in 1825; died in Paris, France, Jan. 14, 1899. He was of Armenian descent, studied in Switzerland and France, and in 1842 became secretary to the minister of foreign affairs in Egypt. Later he served as secretary to Mehemet Ali and Ibrahim Pasha, and in 1866 became minister of foreign affairs, which position he held until 1876. While serving in that capacity, the Sultan of Turkey gave him the title of Khedive. His most important acts included reform measures to introduce European customs into Egyptian affairs. He was president of the Egyptian cabinet from 1878 to 1879, from 1884 to 1888, and from 1894 to 1895. At the close of the year 1895 he resigned on account of failing health.

NUBIA (nū'bĭ-ä), a region of Africa, situated south of Egypt, west of the Red Sea, and north of Abyssinia. The area is about 445,000 square miles. It extends west into the Sahara Desert and the Sudan. The surface consists largely of desert regions, but there are fertile districts along the Nile and Mareb rivers, and some of the valleys extending inland from the Red Sea. Nubia was known as a part of Ethiopia by the ancients. It formed a part of the possession of the Pharaohs, but later was organized by native rulers, who adopted a form of Christianity and a civilization patterned after the Egyptian. Within the last century it has had a varied existence, being governed in the early part of that period by native chiefs of the Moslem faith, but in 1820 it was conquered for Egypt by Ismail Pasha. It is at present connected in part with the government of upper Egypt and in part with the Egyptian Sudan. The inhabitants consist largely of Numidians of the Ethiopian and Arabian races, who have a dark-brown complexion and a medium stature. They engage principally in the culture of cereals and in pastoral pursuits. Among the principal exports are timber, ivory, ostrich feathers, honey, musk, and small grain. The manufactures consist of rude pottery, coarse cotton and woolen goods, and household utensils. Slavery existed until within comparatively recent times and polygamy is still practiced. Mohammedanism is the recognized

form of religion. The population is about 1,500,000.

NUISANCE (nū'sans), in law, any act which annoys or gives trouble and vexation, and which impairs the use and enjoyment of property or the reasonable exercise of liberty. A *public nuisance* is one that effects a considerable number of people, or an entire community, while a *private nuisance* is injurious only to one person or a very small number of persons. The former class includes such offenses against the public as interfere with the trades or public intercourse. These embrace the maintenance of a slaughterhouse or a soap factory in which the smell is unwholesome, or a boiler factory or gas engines which make constant and disagreeable noises. Among the private nuisances are those injuries which result from emptying sewage or conducting drainage upon the property of a neighbor. Both public and private nuisances are criminal, but those guilty of an offense of this kind may be held liable for the payment of damage in addition to being punished by criminal proceedings. The question of determining what constitutes a nuisance is subject to the investigation of a court of record, but immediate restraint may be obtained by an injunction. A violation of an order of a court to abate a nuisance renders the party guilty of contempt.

NULLIFICATION (nŭl-lĭ-fĭ-kā'shŭn), in government, an act whereby the law is rendered null and void and inoperative. It was first applied in the United States by advocates of state sovereignty, in 1799, when adherents of that political belief urged the passage of resolutions in the Kentucky Legislature for the purpose of rendering illegal certain acts of the Federal Congress. The theory was exemplified in Pennsylvania by the Olmstead Case, in 1809, and in Georgia in the matter of the Cherokees, in 1825-30, but it was urged particularly in 1830 by John C. Calhoun. He asserted that a State Legislature can declare unconstitutional any Federal law which is objectionable to that State, and thought it could withdraw from the Union in case such a law were enforced. The Legislature of South Carolina passed a law in 1832 to nullify a tariff enactment passed in that year, but President Jackson issued a proclamation declaring nullification incompatible with the existence of the Union and contrary to the Constitution. South Carolina repealed the nullification ordinance after a compromise tariff bill introduced by Henry Clay was enacted. The theory of nullification was entirely suppressed by the defeat of the Confederacy in the Civil War.

NUMA POMPILIUS (nū'mà pŏm-pĭl'ĭ-ŭs), the second King of Rome, successor of Romulus, who is made by tradition the ruler from 716 to 672 B. C. He is reputed of Sabine origin, a native of Cures, and the son of Pompo. His natural ability and philosophical training caused him to become popular as a legislator, and, when the people chose a ruler, it was natural that he should receive their support and later the approval of the senate. Numa is known more particularly by tradition than by history. He is regarded the founder of the Roman religious institutions and ceremonials and is looked upon as one of the ablest of the early expounders of the principles of justice, law, and morality. He left a number of writings, but they were burned about 400 years after his death. His reign of 39 years was a golden period of peace and he died greatly honored from a natural cause.

NUMBER, in grammar, that form of a word from which it may be determined whether the speaker or writer refers to one or several individuals. There are two numbers, the singular and the plural. The *singular number* denotes but one and the *plural number* denotes more than one. In arithmetic, number is the measure by which quantities are classified. A number divisible by two is called an *even number;* when not so divisible, it is *odd;* and when it cannot be divided by any other number, except itself and unity, it is said to be *prime*. An *abstract number* is one written by itself, as 8; and a *concrete number* is one denoting a certain denomination, as 8 children. *Ordinal numbers* designate the position, as first, second, third, fourth, etc., while *cardinal numbers* answer the question, How many? as 1, 2, 3, 4, etc.

NUMBERING MACHINE, a mechanical apparatus for placing consecutive numbers upon cards and sheets of paper. A variety of machines are in extensive use for this purpose, since they have come to be a necessary supply for printers and blank-book manufacturers. The larger kinds are operated by treadle or power, and the work to be numbered is fed in a manner similar to the method employed in a printing press. In these machines the figures are on wheels, from which the number is printed, and these wheels work automatically so that the next consecutive number is brought into place as the paper is removed. The type figures are inked by the motion of the machine, hence the work of numbering is rapid. The wheels are in series, moving consecutively as each ten units are marked.

NUMBERS, Book of, the fourth of the five books of Moses, called Bemidbar in the Hebrew canon. It describes the numbering of the children of Israel, the continuation of the laws given to Moses in the Wilderness of Sinai, the march through the wilderness, the rejection of the whole generation, and the entrance into the land of Canaan. A period of 38 years is comprehended in this book, which opens with the second month of the second year after the deliverance from the land of Egypt. Its authorship is generally attributed to Moses, but some writers think that it is composed of several parts written by a number of authors.

NUMIDIA (nū-mĭd'ĭ-à), the name applied by the Romans to a large region in Northern Africa, which nearly corresponds to the region

occupied at present by Algeria. The territory varied somewhat according to the fortunes of war, being at one time restricted to the present territory of Tunis, but it was enlarged by the successes of Roman military leaders. The inhabitants at the time of Roman occupation are the progenitors of the modern Berbers. They are noted for their excellent horsemanship, skill in warfare, and unscrupulousness in practicing savagery. At first they were governed by tribal chiefs, but subsequent to the Second Punic War they were united under the king of the eastern Numidians, Masinissa, and soon became allies of the Romans and aided in the contest against Hannibal. Subsequently this king effected a still greater union of the different tribes, and the united nation developed marked power under Jugurtha and Juba. Caesar attained a victory over Juba I. and made Numidia a Roman province in 46 B. C., but a large region in the western part was given by Augustus to Juba II. Cirta was the capital of Numidia under the Romans. Subsequently it became known as Constantine, a name it still retains. Other towns of importance were Hippo Regius, Theveste, Lambaesa, and Zama.

NUMISMATICS (nū-mĭz-măt'ĭks), the study of coins and medals, treating of their historical, economic, and artistic aspects. The word *coin* has reference to a piece of metal bearing an impressed device and designed for circulating as money. A *medal* is a large piece of metal struck with one or more dies, intended to commemorate some event, and is not designed for circulation. The term *medallion* is used as a synonym of medal, while a *medallet* is a small medal, and a *token* is usually but not always of the same size as the current coin of the country in which it is issued, but is struck for the use of private individuals. Coins and medals are sometimes made of gold, but more frequently of silver, bronze, brass, copper, or electrum. The term *billon* denotes a debased silver used in some coinage and *potin* is a softer alloy than billon. The space not occupied by a device or inscription on a coin or medal is called the *field*. Coins of all kinds usually have various inscriptions, such as names, titles, and legends. Genuineness is indicated on a coin by a mint mark.

The study of coins and medals has been pursued from ancient times. It is a prolific source of knowledge of ancient arts and sciences. Many important dates and knowledge of historic events have been obtained wholly from the coins of ancient nations. This fact was recognized by the Romans, who gave much attention to the science of numismatics, and it is likely that some specimens now in modern museums were included with the collections of ancient Rome. Petrarch is said to have been the first modern collector of coins, and since his time vast accumulations of both coins and medals have been made. The zeal with which collectors have gathered treasures of this kind caused an unusual rise in the value of many specimens, especially those dating from ancient and medieval times. The collections are usually classified as ancient, medieval, and modern, depending upon the period in history in which they were coined. Those dating from before the Byzantine Empire, in 330 A. D., are classed as *ancient;* from that date until the succession of Charlemagne, as *medieval;* and from Charlemagne until the present, as *modern.*

NUMMULITE (nŭm'mū-līt), the name given to a class of animals found in the shallow waters of warm seas. They belong to the calcareous foraminifera. The shells are composed of many whirls coiled in a flat spiral. At present only a few species are extant, but in ancient geological times these animals were very abundant. They constituted an important branch of animal life, since the remains of their shells caused limestone formations of great thickness, in some places several hundred feet. Formations of this kind are very prominent in the Alps of Europe, in Central America, in Asia Minor, and in the northern part of Africa. They are known as *nummulitic limestone* and are valuable for construction purposes.

NUN, a member of a religious order of women, who has devoted herself to a religious life and lives in a convent under a perpetual vow of poverty, celibacy, and obedience. The origin of the word is not clearly known, but it is thought to be from a Coptic or Egyptian root, which means *virgin.* Nuns are governed quite largely in convents by rules which are similar to those governing masculine orders. The superiors are known as abbesses or prioresses and generally are called *mother superior.* Their occupations vary according to fitness and the conditions prevailing in the country where the convent is maintained. The most common employment includes the work of education, the care of the sick or poor, and various employments in household or productive arts. It is said that Saint Anthony, in 250 A. D., aided his sister in founding the first nunnery and he was the first to write an authentic account of nuns. At present there are more nuns in the Roman Catholic Church than monks. In some countries they have a large share in the development of education and educational arts.

NUNCIO (nŭn'shĭ-ō), a prelate representing the Pope at a foreign government. He represents the pontiff only as a temporal sovereign, but is sometimes commissioned to treat of spiritual affairs and to report on the condition of churches and the fitness of candidates for the mitre. A nuncio may be *resident* or *extraordinary.* He is styled an *internuncio,* if he is appointed simply to fill a vacancy. In France the nuncio is only recognized as the papal ambassador and is forbidden by law to exercise ecclesiastical jurisdiction.

NÚÑEZ DE ARCE (nōōn'yăth dā är'thā),

Gaspar, poet and dramatist, born in Valladolid, Spain, Aug. 4, 1834; died in 1903. He studied at Toledo and became an editorial writer for the *El Observador* at Madrid. From 1859 to 1860 he served as correspondent in the war against the natives of South Africa. He was civil governor of Barcelona under Sagasta in 1882. His poetical writing began at an early age, in 1875, when he completed a collection of lyrics entitled "Gritos del combate." Other works include "Vértigo," "Visión de Fray Martin," and "Idilio." His "Haz de leña" is a drama that relates to the story of Phillip II. and his son Don Carlos. Many editions of his poems have been published.

NUR-ED-DIN MAHMUD (nōōr-ĕd-dēn' mä-mōōd'), Emir and Sultan of Syria, born in Damascus, Turkey, in 1116; died there in May, 1173. He is celebrated as a patron of learning and art, established mosques and hospitals, founded cities, and gave encouragement to industrial arts, but he became equally celebrated as an avowed opponent to the spread of Christianity. His father was poisoned by eunuchs in 1145, when he became Emir of Bassorah. He defeated the first and second Crusades of Christians to the Holy Land. Later he made a successful campaign in Tripolis, obtained possession of Damascus, and in 1168 assumed the title of Sultan of Syria and Egypt. He ranks as one of the most successful military defenders of the Moslem faith. Writers give him credit for prudence in war. He is said to have been the first to employ carrier pigeons to convey messages in the time of war.

NUREMBERG (nū'rĕm-bĕrg), or **Nurnberg,** a city of Germany, in Bavaria, on the Pegnitz River, 94 miles northwest of Munich. It is nicely located on a well-cultivated plain, has extensive railroad connections, and is the center of a large trade. Communication by urban and interurban points is maintained by electric railways. Among the manufactures are chemicals, railroad cars, metal products, spirituous liquors, musical instruments, clocks, machinery, cigars, lead pencils, toys, and hardware. Nuremberg is one of the largest hop markets in Europe and is noted for its extensive printing and bookbinding industry.

The city has a fine system of public schools and is the seat of the Germanic National Museum and the Bavarian Industrial Museum. It contains the interesting churches of Saint Lawrence, Old Lady, and Saint Sebald, three Gothic structures built between the 13th and 15th centuries. Besides the libraries in its museums, it maintains a public library of 200,000 volumes. It has a number of noted educational institutions, several fine parks, electric lighting, and a number of historic statues and monuments. Among the new buildings are the chamber of commerce, the courthouse, the municipal theater, and the central railroad station.

Nuremberg dates from 1024, when its castle was founded by Conrad II. This building was improved by Frederick Barbarossa in 1158 and was a favorite residence of the German emperors from 1424 to 1806. The palace contains excellent carvings, frescoes, and many treasures of art. Nuremberg entered enthusiastically into the spirit of the Reformation. Gustavus Adolphus was besieged here in 1632 by Wallenstein. The discovery of the sea passage to India caused it to lose a portion of its prosperity and the Thirty Years' War cost 10,000 of its inhabitants their lives. It became a part of the Rhenish Confederation in 1803 and was annexed to Bavaria in 1806. Since the extensive building of railroads in Germany it has again entered upon a period of enlarged prosperity. Population, 1920, 332,651.

NURSE, a person who is especially employed to attend the young, infirm, or sick. Nursing as it is understood at present is of comparatively recent origin and may be said to date from 1872, when trained nurses began to be sent out from training schools to care for the sick. Formerly this duty often devolved upon persons who were ignorant of the care needed by patients, but at present numerous institutions are maintained to thoroughly train both men and women for this class of work. The movement started by Florence Nightingale at the time of the Crimean War tended to stimulate interest in establishing training hospitals for nurses, and in 1887 Queen Victoria devoted a fund of $350,000 to the foundation of such institutions. At present nurses are trained for special work in all civilized countries, both with the view of caring for the sick in hospitals and to visit the homes on calls as aid is required.

NURSERY (nûrs'ĕr-ў), an institution for the propagation of useful plants, especially flower and fruit-bearing shrubs and trees. The rearing of herbaceous plants properly belongs to floriculture, while the care and early rearing of woody plants is a department of horticulture. Many nurseries are maintained in Canada and the United States, but the most extensive in America are located in the vicinity of Rochester, N. Y. All classes of shrubs, such as the blackberry, gooseberry, and raspberry, are cultivated. The larger fruits include the plum, grape, apple, peach, prune, pear, and fig. The growth and sale of these classes of plants when they are from one to four years old is an industry of great magnitude. Fully 4,500 nurseries are maintained in the United States. In most cases the scions are grafted into native stock. Most of the nursery products are sold through agents, who have them shipped to some central point to be delivered during the planting season.

NUT, the name used in botany to designate a fruit consisting of a seed, or kernel, inclosed in a hard leathery or woody shell that does not open when ripe. The term is restricted usually to a one-seeded pericarp resulting from a compound ovary, but it is sometimes applied to cer-

tain tubers, as those of the sedge, known as *nut grass*. The most valuable and best known nuts include the walnut, hickory nut, hazelnut, Brazil nut, butternut, cocoanut, chestnut, and pecan. Nuts form an important article of commerce, many of them being edible, while others furnish important medical or chemical properties. Those named above are all edible, while the gallnuts, valonia nuts, and myrobalan nuts serve in dyeing and tanning. Vegetable ivory, secured from the nut of the Peruvian palm, and coquilla nuts serve in the manufacture of ornaments. Betelnuts are used in manufacturing tooth powder and paste. Many of the oil nuts of commercial importance are not edible, though most of the edible nuts are rich in oil and contain sugar, starch, and nitrogenous constituents.

NUTATION (nū-tā'shŭn), in astronomy, a small periodic gyratory movement in the direction of the earth's axis, by which, if it existed independent of the motion in precession, the pole of the earth would describe a minute ellipse in the heavens. The nutation period is 18.6 years and corresponds to that of a revolution of the moon's nodes, with which it is directly connected. The nutation is combined with the precession of the equinoxes, both of which movements are due to the effect of the action of the sun and moon upon the earth. See **Precession.**

NUTCRACKER (nŭt'krăk-ẽr), a genus of birds distributed widely in Europe and Asia, which somewhat resemble the starlings

A, Nutcracker; *B*, Nuthatch.

and woodpeckers. They have a cone-shaped bill and square-cut tail and the plumage is of different shades of brown, studded with long white spots. These birds are so named because they feed on nuts, which they carry to some convenient crevice in a tree and hammer them with the beak until the kernel is exposed. However, they likewise feed on insects and beetles. The eggs are a pale bluish-green and are marked by pale olive or ash-colored freckles. An allied species of birds found in America frequents the shores of streams and seas and is noted for its plumage of diversified hues. It is about thirteen inches long and the bill is about two inches.

NUTHATCH (nŭt'hăch), a genus of birds of the family *Paridae*. These birds are represented in North America by the *white-bellied nuthatch*. It is distinguished for its short legs, a sharp, straight bill, hooked claws, and solitary and shy habits. The genus includes many species, most of which are about six inches long. They build their nests in hollow trees, to which they carry leaves and sticks, and, like the nutcracker, are fond of nuts. However, they also cut into the stems of trees for insects much like the woodpeckers and are noted for being extremely shy. The color is bluish-gray on the upper parts, the under parts are reddish-brown, and the flanks are a rich chestnut color. The bill is wedge-shaped. They are often seen descending the trunk of a tree head downward.

NUTMEG (nŭt'mĕg), the kernel of the fruit of various trees, especially that of the nutmeg tree. The fruit is an edible drupe of a yellow-

NUTMEG.

A, Male flower; *B*, female flower; *C*, nut; *D*, nut with crillus; *E*, nut with shell.

ish color. It is about two inches in diameter and, when mature, splits into halves, exposing a single seed. The seed has a thin hard shell, surrounded by a fibrous substance of crimson color, which, when dried, becomes the *mace* of commerce. When the kernel is dried and shelled, it becomes the *nutmeg*, which is valued highly in cooking for its aromatic odor and flavor. The kernel yields the *oil of mace*, or *nutmeg butter*, which is obtained from it by compression. Nutmegs are produced extensively in the East Indies, but the cultivation of the nutmeg tree is now carried on in the West Indies, portions of Central America, Brazil, and Su-

matra, where it has been naturalized. It attains a height of from fifteen to thirty feet, has a reddish-brown bark, and branches considerably.

NUTRITION (nū-trĭsh'ŭn), the process by which growth is promoted and waste is repaired in any living organism, which applies both to animal and vegetable life. Animal nutrition embraces the process or change which the food elements in the blood currents undergo for the production of energy or heat, and for the purpose of conveying certain waste matter from the system. Healthful nutrition is stimulated by a wise selection of the food with the view of providing the necessary support to the body. The food is masticated in the mouth and mixed with saliva. It is then swallowed, acted upon in the stomach by the gastric juice, and passed into the intestines, where it is dissolved by the bile, pancreatic juice, and other liquids. In the processes it undergoes in the stomach and intestines the nourishing parts are absorbed and thrown into the blood vessels. The tissues derive their nutrition from the blood in the capillaries. The material for it is prepared in the blood. Each individual part by a process of cell growth carries on the work by which the various portions of the body are enlarged, or by which the waste is overcome. Vegetable nutrition consists of the seven processes known as absorption, circulation, respiration, transpiration, excretion, assimilation, and growth. The root, stem, and leaf are the organs of nutrition.

The varieties of human food differ materially in the per cent. of nutritious substances, as is shown by the following list of common foods:

Raw oils	94	Roast pork	24
Boiled beans	93	Fried veal	24
Butter	93	Potatoes	22½
Boiled barley	92	Broiled venison	22
Baked cornbread	91	Boiled codfish	21
Wheat bread	90	Peaches	20
Barley bread	88	Apples	16
Boiled rice	88	Beets	14
Broiled beans	87	Whipped eggs	13
Rye bread	79	Currants	10
Oatmeal porridge	75	Cabbage	7½
Broiled mutton	30	Milk	7
Raw plums	29	Boiled turnips	4½
Raw grapes	27	Raw melons	3
Raw beef	26	Raw cucumbers	2
Roast poultry	26		

NUX VOMICA (nŭks vŏm'ĭ-kà), the name of a tree native to the East Indies, known as *Strychnos nux vomica,* or *poison nut,* by botanists. It has a crooked trunk and smooth bark. The leaves are round, smooth, and ribbed and the flowers are greenish white. It bears a berrylike fruit about the size of a small apple, but has a bitter shell and a white pulp. The wood of the tree is exceedingly bitter, especially that of the roots, and the seeds are extremely poisonous. Strychnine and other powerful drugs are prepared from the seeds. See **Strychnine.**

NYASSA (nê-äs'sà), a lake of Africa, situated on the southwestern boundary of German East Africa. It is 300 miles long and from 20 to 60 miles wide. The surface is 1,525 feet above sea level. It receives the water from several rivers and has a great depth, being 700 feet deep in the southeastern part. The Shire, a tributary of the Zambezi, is its outlet. The Portuguese first discovered the lake in the 17th century and named it Maravi, but definite knowledge of it dates from its discovery by Livingstone, in 1859. It has fresh water and abounds in fish.

NYASSALAND, a region of Africa, situated west of Lake Nyassa and populated by native tribes. It is now included in British Central Africa. The region has extensive forests, is alternated more or less with undulating plains and hills, and much of the soil is highly fertile. The natives cultivate tobacco, maize, cassava, peas, and fruits and engage in trade. Formerly an extensive slave trade was carried on in the region by Arabs, but this has been suppressed recently. Several large Christian missions are maintained among the natives. The principal missionary and trade stations are at Port Johnston, Livingstonia, Marengas, and Blantyre. See **British Central Africa.**

NYE, Edgar Wilson, humorist and author, born in Shirley, Me., Aug. 25, 1850; died in Asheville, N. C., Feb. 22, 1896. His parents settled in Wisconsin in 1852, and he was educated at River Falls in that State. In 1875 he settled in Wyoming, where he was admitted to the bar the following year, and in 1881 began the publication of the *Laramie Boomerang.* It was his practice to write in a humorous vein, giving to small things great proportions, and, on the other hand, minimizing the more important. By his characteristic style and energy he succeeded in calling wide attention to his town. Articles from the pen of *Bill Nye,* as he was generally called, were read with interest in all parts of the United States. While publishing his paper, he held the positions of justice of the peace, school superintendent, postmaster, and United States commissioner, and afterward became a member of the Legislature. Later he suspended publication of his newspaper and settled in Hudson, Wis., as a lecturer and a contributor to periodicals, but after two years was engaged as a writer in New York. His contributions to the press were controlled by a syndicate and appeared in nearly all of the dailies and weeklies of the United States, much of the matter being stereotyped for that purpose. He published his first book in 1881 with the title of "Bill Nye and the Boomerang." Other writings include "Stag Party," "Bill Nye's Blossom Rock," "Bill Nye Thinks," "Baled Hay," "Forty Liars and Other Lies," "Remarks by Bill Nye," "Bill Nye's History of the United States," and "Bill Nye's History of England."

NYLGHAU (nĭl'gą), or **Nilgai,** an antelope which is native to the forests of Southern Asia. It has a head and body resembling those of the ox, but the limbs are long and slender, fitting it to move with great rapidity. The height at the shoulder is about four and one-half feet. The

neck is compressed and characterized by a mane and a tuft of hair adorns the breast. The color is brownish gray and the male has horns which are as long as the ears. Several species are found in India and Persia, where they are hunted for their flesh, which is a favorite article of food. The skin is useful in the manufacture of leather.

NYMPHS (nĭmfs), the graceful beings mentioned in Greek mythology as the presiding deities of the woods, streams, meadows, grottoes, hills, and the sea. These divinities were supposed to be beautiful maidens of fairylike form, though not immortal, and were robed in more or less shadowy garments. They were considered minor beings and no temples were dedicated to them, but they were held in the greatest veneration and were worshiped in grottoes or caves. Several classes of nymphs were held in high esteem. They included the Nereids, who presided over the sea; the Dryads, over the trees and forests; the Naiads, over wells, fountains, and lakes; and the Oreads, over mountains. Much beautiful statuary was dedicated to the nymphs, of which fine specimens are still extant.

O, the fourth vowel and fifteenth letter of the English alphabet. The form of the letter was derived from the Phoenician through the Greek and Latin. It is uttered with the lips rounded and the back part of the tongue raised. In the English, *o* has six sounds or shades of sounds, as *o* in *not, thought, go, move, woman,* and *come.* It combines with other letters to form digraphs, as *oa, oo,* and *ou.* In arithmetic, it serves as a cipher; in grammar, as an interjection; and in chemistry, to denote the element oxygen.

OAHU (ō-ä'hōō), one of the principal islands of the Hawaiian group, the third of the group in size. It is situated between the islands of Molokai and Kauai, being separated from the former by Kaiwi Channel and from the latter by Kaieie Waho Channel. The coast line is indented by a number of bays. It is fertile and well watered. The vegetation is luxuriant. Honolulu, the capital of the Hawaiian Islands,

is situated on its southern coast. Population, 1922, 143,540.

OAJACA. See **Oaxaca.**

OAK, a genus of trees and shrubs of the order *Cupuliferae,* widely distributed in the temperate zones of all the continents, but most abundant in North America. They are not common to the tropical regions of South America, Africa, or Australia. Fully 300 species have been described, including both deciduous and evergreen trees. Among the latter are the *ever-*

OAK LEAVES AND ACORNS.

green oak of California and the *live oak* native to the southern section of the United States. The oak tree is noted from remote antiquity on account of its hardy wood and long endurance, from which it has been called the "Monarch of the woods" in poetry and oratory. It is of slow growth, attains a height of from 40 to 150 feet, and has long and spreading branches. All species bear a fruit known as the *acorn,* which is a nut set in a cup. The leaves are variously formed, though they are mostly sinuate-lobed. The flowers are male or female, the male flowers being in scaly spikes and the female being bud-shaped. Among the principal species are the white oak, burr oak, red oak, live oak, black oak, willow oak, scarlet oak, cork oak, Turkey oak, valonia oak, Barbary oak, evergreen oak, manna oak, and gall oak.

The oak tree is one of the noblest appearing forest trees. It reaches maturity in from 125 to 400 years and endures to the age of from 600 to 1,000 years. In some European countries are oak trees that have existed for eight centuries in good condition. Interesting historical incidents are associated with many of these trees, particularly the so-called *King Oak* of Windsor Forest, which is associated with the historical times of William the Conqueror.

The wood of the oak tree is of much value in the industries, owing to its strength and endurance. It serves in the manufacture of furniture, for shipbuilding, in the construction of vehicles and mechanical appliances, and all classes of construction work where a durable and hardy wood is desired. Oak bark is used in the medical practice and for tanning. *Oak galls,* morbid growths resulting from the sting of insects, are likewise employed for the latter purpose. *Cork oak* is grown extensively in the countries adjacent to the Mediterranean and supplies the cork of commerce. Acorns serve in many countries as valuable food for swine and other domestic animals. The acorns of the *Turkey oak* and several other species are sweet and edible, and are used to some extent in making sweetmeats. The *white oak,* one of the most valuable of hardwood trees, is found from Canada to the Gulf of Mexico. Oak sawdust and bark serve in dyeing, yielding drab and brown colors, and a fustian cloth is made of the inner bark. The oak tree thrives best in loamy soils, but does not grow in stagnant water, and its roots penetrate deeply into the ground.

OAK GALLS, or **Oak Apples,** the growths caused upon different kinds of oak trees by the punctures of various insects. About 1,000 species of oak insects are native to North America. These insects pierce the stems of oak trees and deposit a quantity of poisonous fluid and their eggs. An oak gall begins to form rapidly, shortly after the puncture has been made, and before the eggs are hatched they are fully inclosed by it. The young insect develops into a gall fly while in the gall nut, but soon becomes liberated by eating its way out. Oak galls are of value in tanning and for the manufacture of ink.

OAKLAND (ōk'lạnd), a city in California, county seat of Alameda County, on the Bay of San Francisco, six miles east of San Francisco. It is on the Santa Fe, the Southern Pacific, the Western Pacific, and other railroads, and is connected with San Francisco by ferries. Communication with urban and interurban points is maintained by an extensive system of electric railways. The climate is healthful and the scenery in the vicinity is very beautiful, making the city a favorite point for tourists and a residential center for San Francisco business men. Many of the streets are finely paved with bitumen and macadam. It has systems of sanitary sewerage, waterworks, and police and fire service. Among the manufactures are cotton and woolen goods, flour, leather, lumber products, machinery, jute, boots and shoes, and earthenware.

Oakland is regularly platted and well built. The noteworthy buildings include the municipal auditorium, the city hall, the Hotel Oakland, the Oakland Tribune Tower, the Elks Building, the Oakland Bank, the public library, and many schools and churches. The public high school is a fine architectural structure. Lake Merritt, a salt-water lake, is surrounded by Lakeside Park. Oakland was first settled in 1850 and incorporated two years later. The place was chartered as a city in 1854. It was so named from a natural grove of oaks. Population, 1900, 66,960; in 1920, 216,361.

OAKUM (ōk'ŭm), a substance used for calking the seams of vessels. It is made by picking to pieces the threads of ropes obtained from the rigging and cables of ships. This work was formerly done by hand, but is now prepared by machinery. The rope is first cut into short lengths to be steamed so as to dissolve out the tar, after which the strands are pulled apart and cleaned of dust in carding machines. The finished product is colored a fine yellow by the use of saffron.

OAR, a piece of wood used to propel a boat or barge. It consists of three parts, the blade, handle, and loom. The *blade* is the flat end that is dipped into the water, the *loom* is the middle part, and the *handle* is rounded to be fitted for the hand. Small boats are propelled with two oars, one being worked by each hand, and larger boats have two or more sets. A *sweep* is a large oar and a *scull* is a small one.

OARFISH, a species of the ribbon fishes. It has an elongated body, which is greatly flattened or compressed. On the back is a long dorsal fin, extending the entire length of the body. Some specimens are twenty feet long and only a few inches thick, hence the name. It is probable that this fish has given rise to the frequent reports of sea serpents.

OASIS (ō'ā-sĭs), a name now generally applied to any fertile tract of land in a desert region, but it was originally the name of several cultivated spots in the Libyan Desert, which were rendered productive by a number of springs issuing from the ground. The oases of the Libyan Desert are situated about 200 miles west of the Nile. They were known to the ancients by the names of Ammon and the Greater and Lesser Oases. Other oases are common to various parts of the Sahara Desert, the Desert of Gobi in Central Asia, the deserts of Persia and Arabia, and the Kalahari Desert of South Africa. Several oases of the Libyan Desert were mentioned by Herodotus and were visited by Alexander the Great after the conquest of Egypt. Artificial oases have been formed in many parts of the Sahara by sinking wells.

OAK PARK, a city of Cook County, Illinois, 10 miles west of Chicago, on the Chicago and Northwestern and other railroads. It is popular as a residential center of Chicago business men. The features include surface and elevated street railways, high school, Y. M. C. A., village hall, public library, gas and electric plants, and many churches. It was settled about 1840 and incorporated in 1900. Pop., 1920, 39,858.

OATES (ōts), **William Calvin,** statesman, born in Pike County, Ala., Dec. 1, 1835; died Sept. 9, 1910. He attended the public schools, studied law, and in 1858 was admitted to the bar. In 1861

he entered the Confederate service as a captain, commanded in a number of important battles, and in 1864 lost his right arm in the engagement at Richmond. Soon after the war he served as a member of the Legislature of Alabama, took part in the constitutional convention of 1875, and in 1881 was elected to Congress as a Democrat. His efficient service caused him to be reëlected a number of times. In 1898 he served in the war against Spain. Oates possessed efficiency as a speaker and was influential as a public man. He published "The War Between the Union and the Confederacy."

OATS, a genus of grasses, including about sixty species. Many are grown for the production of hay and for their straw and seed. They are cultivated extensively in all temperate climates and form valuable food for horses and cattle, but the seed of some species is used for human food. The cultivated species are thought to be native to Asia, where they were grown from an early date. The greatest yield per acre is in the region extending somewhat south of the center between the Tropic of Cancer and the North Polar Circle. The annual production of the United States aggregates fully 812,500,000 bushels, which represents a value of about $210,000,000. Among the leading oat-producing states are Iowa, Illinois, Wisconsin, New York, Minnesota, Pennsylvania, Nebraska, Ohio, Kansas, Missouri, and Michigan. Canada likewise has a large yield, the average annual crop being about 278,500,000 bushels. Ontario, Manitoba, Alberta, Saskatchewan, British Columbia, Quebec, and Nova Scotia produce large quantities.

HEAD OF OATS.

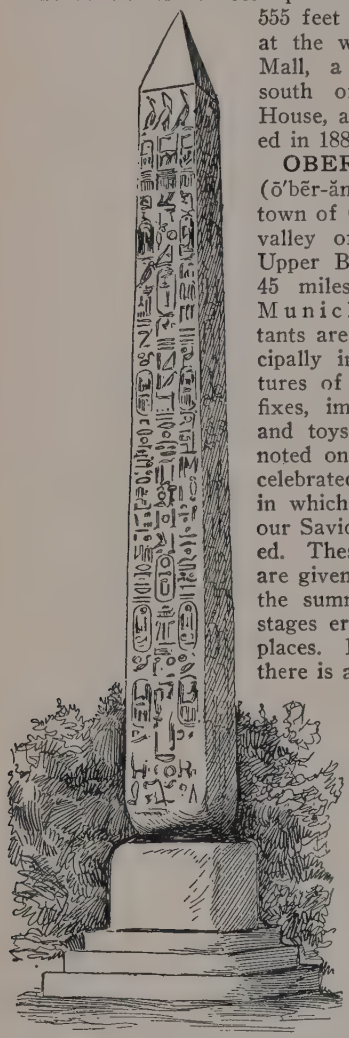
The best species are the common white oats, Hungarian oats, bristle-pointed oats, Chinese oats, naked oats, Siberian oats, short oats, and peeled corn oats. The seed is sown in the spring, usually in April, and the crop is harvested in July or August. Oats yield from twenty to eighty bushels per acre, this depending upon the soil and climate, and weigh from 28 to 45 pounds per bushel. They are fed to stock, but principally to horses, after being threshed. Oats are prepared for table use by the kernel being separated from the outer shell, when they become a very nutritious food, and are eaten largely as a porridge and in cakes. Oatmeal mills are vast industrial enterprises, such as are operated in Chicago, Buffalo, Kansas City, Toronto, and elsewhere.

OAXACA (wä-hä'kà), or **Oajaca,** a city of Mexico, capital of a state of the same name, 225 miles southeast of Mexico City. It is connected with other Mexican cities by railways. The place is well built and is surrounded by a fertile agricultural and fruit-growing country. In the vicinity are many gardens and cochineal plantations. Among the manufactures are sugar, clothing, cotton and woolen goods, chocolate, machinery, and utensils. The city has a number of fine schools, a cathedral, and a public library. It is the seat of a bishopric and a theological institution. The place was founded in 1486 by the natives and was captured by the Spaniards in 1522. Population, 1922, 37,469.

OBADIAH (ō-ba-dī'ah), the fourth of the minor prophets, whose book contains only one chapter of 21 verses. His prophecies consist of denunciations against the Edomites for helping to plunder Jerusalem, when that city was captured by a heathen foe. Toward the latter part of the book are predictions of the future glory in store for the Jews. It is thought that the book was written between 588 and 583 B. C.

OBELISK (ŏb'ĕ-lĭsk), a square monument with a pyramidal top, generally diminishing in size toward the upper end. Ancient Egypt contained many obelisks, which were erected as symbols to the supreme god. It is thought that the first obelisk was constructed in the time of the Trojan War by Rameses, King of Egypt, who employed 20,000 men in building a monument forty cubits high. The majority of Egyptian obelisks have a uniform thickness in proportion to their height, being from one-ninth to one-tenth as thick as they are high, though in height they vary from a few inches to 180 feet. Many of the Egyptian monuments of this character were removed to Rome by the Roman emperors. In 1833 a beautiful specimen from Luxor was erected in Paris. Two taken from Heliopolis by Rameses II. and erected in Alexandria became known as Cleopatra's Needles. One of these was erected in Central Park, New York, and the other in London, England, both being presented to the respective governments by the Khedive of Egypt. Formerly obelisks were very common in Egypt, but at present only 42 erected in that country are known. This number includes the two taken to Paris, in 1833 and in 1836, five taken to England, one transported to the United States, and those erected in Berlin, Rome, Florence, Vienna, and other European cities. Among the most famous obelisks of American construction are the Washington monument, at Washington, and the Bunker Hill monument. The latter is 30 feet

square at the base and 231 feet high. It was dedicated in 1843 to commemorate the Battle of Bunker Hill, which took place June 17, 1775. The former is 55 feet square at the base and 555 feet high. It stands at the west end of the Mall, a short distance south of the White House, and was dedicated in 1885.



East face of Obelisk in Central Park New York.

OBERAMMERGAU (ō′bĕr-ăm-mĕr-gou′), a town of Germany, in the valley of the Ammer, in Upper Bavaria, about 45 miles southwest of Munich. The inhabitants are employed principally in the manufactures of rosaries, crucifixes, images of saints, and toys. The town is noted on account of the celebrated miracle play in which the passion of our Saviour is represented. These passion plays are given on Sundays of the summer months on stages erected in shaded places. Every ten years there is a special exhibit, to which many thousands of European and American visitors are attracted. The custom of presenting the play every tenth year as a special feature dates from 1633, when the inhabitants were grateful for escaping the ravages of a plague and vowed that the performance should be given periodically. The passion play, when given in its entirety, requires 350 actors. However, in late years the exhibit has taken on a form of profit production. The last special exhibit was given in 1922, when the clear profit to the promoters was $750,000. At that time the gross railroad receipts on account of the passion play were $1,500,000. See **Miracle Plays.**

OBERHAUSEN (ō′bĕr-hou-zẹn), a city of Germany, in the Rhine province of Prussia, near the Rhine, forty miles north of Cologne. It is a railroad and manufacturing center, having large interests in the production of glass, soap, flour, porcelain, wire, and machinery. Extensive coal fields are worked in the vicinity. The place is of recent origin, having been platted in 1845, and the buildings are modern and well constructed. Among the principal buildings are the townhall, the opera house, the gymnasium, and the central railroad station. Population, 1905, 52,166; in 1920, 89,897.

OBERLIN (ō′bĕr-lĭn), a town of Lorain County, Ohio, on surfaced highways and the New York Central Railroad, 34 miles southwest of Cleveland. The surrounding country is fertile. Oberlin is noted chiefly as the seat of Oberlin College (q. v.). It has electric lighting, well-graded streets, and a municipally owned system of waterworks. The chief buildings include the high school and several churches. It was settled in 1833 and incorporated in 1846. Population, 1900, 4,082; in 1920, 4,236.

OBERLIN, Johann Friedrich, eminent minister, born in Strassburg, Germany, Aug. 31, 1740; died June 1, 1826. He received a liberal education and became the Lutheran pastor at Waldbach in 1766, where he spent his entire life in ministering to the spiritual wants of his congregation. The region had suffered materially from the Thirty Years' War and the people had sunk into poverty, but Oberlin employed practical means to secure the adoption of improved methods of education, fostered agricultural arts, and encouraged different branches of manufacture. He established a number of primary schools and several libraries, and by his active interest in the material industries caused the village to increase from 500 to nearly 5,000 inhabitants. The labors of Oberlin were confined to a small town, but his devoted religious and industrial work became known in many portions of the world, and gives evidence of what can be done by those devoted in a persevering manner to a laudable enterprise.

OBERLIN COLLEGE, a coeducational institution at Oberlin, Ohio, founded in 1833. It was chartered as the Oberlin Collegiate Institute, but the present name was adopted in 1850. It includes the College of Fine Arts and Sciences, the Graduate School of Theology, and the Conservatory of Music. The library contains 443,994 volumes, the endowment is $3,650,000, and the college property has a value of $2,703,887. It has a faculty of 161 and is attended by 1,866 students.

OBERON (ŏb′ĕr-ŏn), in mythology, the husband of Titania and the king of the elves and fairies. He has figured prominently in the literature of Western Europe and is referred to in Shakespeare's "A Midsummer Night's Dream."

OBI (ō′bē), or **Ob,** a river of Siberia, one of the largest of Asia. It rises in the Altai Mountains and flows in a general course toward the northwest until it receives the Irtish River, when it makes a turn toward the north and flows into the Gulf of Obi. The Obi has a total length, including the estuary, of nearly 3,000

miles, and it drains an area of 1,200,000 square miles. Near Bogorovsk it is crossed by the Trans-Siberian Railway. It flows through a valley of marked fertility, but the region traversed by it has a rigid climate. It is utilized extensively as a commercial route.

OBOE (ō'boi), or **Hautboy,** a wind musical instrument, played in the manner of a clarinet, which it resembles in form. It has a penetrating quality of tone and is sounded by means of a double reed. This instrument is of great antiquity, dating from an early period in the history of Egypt and Greece. The modern form is about twenty inches in length. Solo compositions for the oboe were written by Handel, Mozart, and Beethoven.

OBREGON, Alvaro. See MEXICO.

O'BRIEN (ō-brī'ĕn), **Cornelius,** clergyman, born in New Glasgow, Prince Edward Island, May 4, 1843. He studied in his native town and at the Propaganda in Rome, Italy, and was granted holy orders in 1871. Soon after he became professor in Saint Dunstan's College, in Charlottetown, and held pastorates until 1882. The following year he was consecrated Archbishop of Halifax, Nova Scotia. He is the author of several important works, including "The Philosophy of the Bible Vindicated," "Memoirs of Bishop Burke," "After Weary Years," and "Early Stages of Christianity in England."

O'BRIEN, William, public man, born in Mallow, Ireland, Oct. 2, 1852. He studied at Cloyne Diocesan College and Queen's College, Cork, and in 1869 engaged as reporter on the *Cork Daily Herald.* In 1880 he founded the *United Ireland,* which he made prominent as an advocate of Home Rule and Irish nationality. He was elected to Parliament in 1883 and represented the Nationalists almost continuously until 1895, when he retired from public service. His ardent support of movements calculated to benefit Ireland caused him to be imprisoned four times under the Crimes Act of 1887. He visited the United States in 1890 to collect funds to promote the Irish cause. In 1898 he organized the United Irish League, an agrarian movement, and established the *Irish People* as its organ. His publications include "Irish Ideas" and "When We Were Boys." He died Feb. 27, 1928.

OBSERVATORY (ŏb-sĕrv'ā-tō-rў), an institution or building fitted with optical instruments and designed for systematic observation of physical and astronomical phenomena. Observations were devoted exclusively, until comparatively recent times, to making a study of astronomical aspects, though in some cases a loose account of weather was recorded. Later provisions were made to observe meteorological phenomena and terrestrial magnetism. The Chinese were among the first to record observations in relation to astronomical study. Some writers assert that the Egyptian pyramids were constructed in harmony with certain stellar phenomena, though it can scarcely be said that observatories existed anywhere prior to about 300 B. C. In that year Ptolemy Soter caused the erection of an observatory at Alexandria, which continued in existence for nearly 400 years. Hipparchus investigated the motions of the sun, planets, and moon in the Alexandrian observatory, where he discovered the precession of the equinoxes. Observatories were built by the Arabians at Bagdad and Damascus in the 9th century A. D. In 1260 a splendid institution of a like character was founded in Maragha, in the northwestern part of Persia.

Bernhard Walther built the first observatory in Europe, at Nuremberg, Germany, in 1472. The revival of practical astronomy properly dates from that time, since many of the newer methods of observation were invented by professors of that institution. Tycho Brahe established two observatories on the Danish island of Hven in the 16th century and Landgrave William IV. built a similar institution at Cassel, Germany, in 1561. These institutions gave an impetus to astronomical interest and facilitated observations by introducing valuable improvements in astronomical apparatus. They caused many universities to found observatories as adjuncts to their institutions.

The principal observatories of Europe were founded as follows: Royal Observatory at Paris, 1667; Greenwich Royal Observatory, 1675; Tuscalan Observatory, near Copenhagen, 1704; Berlin Observatory, 1705; Saint Petersburg, 1725; Vienna, 1756; Oxford, 1772; Edinburgh, 1776; Dublin, 1783; Königsberg, 1813, and Pultova, near Saint Petersburg, 1839. The observatories at Sydney, Australia, and at the Cape of Good Hope were established in 1820. Among the leading observatories of the United States are those at Cambridge, founded in 1839; Washington, 1842; Ann Arbor, 1854; Lick Observatory, in California, 1888; and Yerkes Observatory, at Lake Geneva, Wisconsin, 1897. Canada maintains a number of observatories, including those at Toronto, Quebec, and Saint John, New Brunswick. Notable institutions of this kind are supported by the governments of Mexico, Chile, Brazil, Nicaragua, and other Central and South American countries.

The telescope is the chief instrument used in observatories. It contains the largest lens manufactured for optical observation. Other instruments used in the larger observatories include the barometer, micrometer, chronometer, circle, and clock. They employ photography, photometry, and spectrum analysis. The national observatories, in addition to making observations, communicate intelligence regarding them and probable changes in climatic conditions to various portions of the country. Observatories are usually built on prominent elevations. The employment of large telescopes necessitates the construction of substantial buildings. In most cases the larger telescopes are mounted in such

a manner that they rest securely on foundations built especially for their support.

OBSIDIAN (ŏb-sĭd'ĭ-ạn), a volcanic rock which consists of lime, or potash, and silicate with alumina and iron. Obsidian is generally found in connection with feldspars. It has a glassy appearance and is brittle and hard. The color usually is black, but sometimes it is brown, green, red, or variously striped. It occurs in several regions of Mexico, South America, Iceland, and Eurasia. The early peoples of Peru and Mexico employed it in the manufacture of ornaments and for cutting weapons, while others used it for arrowheads, utensils, and mirrors.

OCARINA (ŏk-ȧ-rē'nȧ), a wind musical instrument of ancient origin, made chiefly of molded clay. It is hollowed within, has a number of holes for keys, and is supplied with a short mouthpiece. In the later types, a row of keys takes the place of the holes in the older forms. This instrument was invented anciently by the Chinese, but was introduced to America by the Austrians. The tone is sweet and enlivening.

OCEAN. See **Sea.**

OCEAN GROVE, a resort of New Jersey, in Monmouth County, thirty miles south of New York City. It is finely located on the Atlantic Ocean, a short distance south of Asbury Park, and may be reached by the Pennsylvania and the Central of New Jersey railways. The beach is a splendid stretch of coast. Among the public buildings are the post office, the high school, and the Auditorium. The last mentioned has a seating capacity for 10,000 persons and is the scene of many religious and educational meetings. Many summer cottages, boarding houses, and hotels are maintained. Strict Sabbath regulations are in force and the sale of tobacco and public games are prohibited. Ocean Grove is popular as a summer resort, in fact is one of the finest summer resorts on the Atlantic coast, and is visited in the summer by over 25,000 people. The resident population is about 1,500.

OCEANICA (ō-shĕ-ăn'ē-kȧ), or **Oceania,** the name applied by some geographers to a large part of the Pacific Ocean, within which they include the islands lying between Asia, the Indian Ocean, the Antarctic Ocean, and North and South America. The term Australasia is applied to the same region by some writers, in which sense they include the continent of Australia. The islands of Oceanica proper are divided into three main groups, including Polynesia, Micronesia, and Melanesia.

OCELOT (ō'sĕ-lŏt), a class of carnivorous mammals. The common ocelot is native to the warmer parts of America and is commonly called the tiger cat. Several distinct species have been described, varying somewhat in size. They are generally characterized by fur of a tawny-yellow or reddish-gray color, marked with spots of black or brown, and are noted for their blood-thirsty disposition. The ocelot is about three feet long, has a tail of about eighteen inches, and is native from Arkansas to the southern part of Paraguay. It is found mostly

OCELOT.

in the larger forests, where it is seen frequently in the act of climbing trees. Its food consists mostly of birds and small quadrupeds.

OCHILTREE, Thomas P., public man, born in 1839; died Nov. 26, 1902. He was educated in the public schools and at an early age joined the Texas Rangers for service against the Indians and marauders. At the beginning of the Civil War he enlisted in the Confederate army, was made a member of the staff of General Sibley, and by efficient service soon received the brevet of colonel. Jefferson Davis made him the confidential messenger to the southern commanders west of the Mississippi. In 1865 he was taken prisoner in the Battle of Five Forks and sent to John's Island in Lake Erie. He was not released until after the surrender of General Lee at Appomattox. President Grant made him United States marshal of Texas, from which State he was subsequently sent to Congress as a Republican. His military service in Texas was valuable in that he succeeded in establishing law and order. While in Congress he was a member of several important committees.

OCHRE (ō'kẽr), or **Ocher,** an earthy oxide employed with oil as a paint. It occurs in deposits, usually about springs that flow from mountains, or rocky beds which contain iron pyrites in a decomposed state. The color is not uniform, varying with the degree of oxidation of the iron, but it may be changed by heat from its usual yellowish color to brown or red. Large deposits are found in many parts of Canada. The output of ochre in the United States is more than 3,500 tons annually, the largest production being in Pennsylvania, Vermont, and Georgia, but there are deposits in many other regions of the country, especially in Missouri and New York. The leading ochre-producing countries of the world take rank as follows: France, Great Britain, the United States, Germany, and Cyprus.

OCKLAWAHA (ŏk'lȧ-wä-hä), a river of Florida, rises in Griffin Lake, and flows into the Saint John's about 22 miles south of Palatka. The general course is toward the north, but in the lower part it flows almost directly east. The

basin is wooded with fine forests. It is about 275 miles long.

OCMULGEE (ŏk-mŭl'gē), a river of Georgia, rising near Atlanta, in the northern part of the State. After a course of about 275 miles toward the south and east, it joins the Oconee in forming the Altamaha River. The valley is fertile and contains extensive forests. On its banks are several thriving cities, of which Macon is the most important. It is navigable for 125 miles. The Little Ocmulgee is its principal affluent.

OCONEE (ō-kō'nē), a river of Georgia, rises in the northeastern part of the State, near Athens. It flows toward the southeast and at its confluence with the Ocmulgee forms the Altamaha. The length is about 260 miles. It is navigable to Milledgeville, about 100 miles.

O'CONNELL (ō-kŏn'nĕl), **Daniel,** noted agitator, born in Kerry County, Ireland, Aug. 6, 1775; died in Genoa, Italy, May 15, 1847. He descended from a respectable family and studied at the colleges of Saint Omer and Douai, where he showed remarkable ability. In 1794 he entered Lincoln's Inn as a law student and in 1798 was called to the bar, establishing soon after a successful law practice. He soon became involved in Irish politics, advocating the dissolution of the union with England, though he kept within constitutional limits in advocating reforms. To make his efforts more effective, he promoted the organization of a Catholic association, whose object was to secure the emancipation of the Catholics, and in 1829 he became a member of Parliament. There he advocated free trade in corn. He favored universal suffrage, Negro emancipation, and greater civil rights for the Jews. He was notably conspicuous in urging the Catholic claims. In the latter he succeeded in securing the support of the Duke of Wellington and Sir Robert Peel. He was reëlected to Parliament in 1830 and continued a member of that body until his death, though he was elected from different localities at various times.

In 1840 O'Connell began to develop his policy by holding meetings throughout Ireland, for which purpose he traveled from place to place, and everywhere was greeted by enormous crowds. His efficient and skillful work so aroused the people of Ireland that an almost universal sentiment in favor of separation from England became manifest, and this so affected the government of Sir Robert Peel that it was determined, in 1843, to suppress further agitation. Accordingly an army of 35,000 men was sent to Ireland. O'Connell and a number of others were placed under arrest and sentenced to imprisonment with a fine of $10,000, but, after remaining in prison for fourteen weeks, the House of Lords set aside the judgment. His health became impaired during the imprisonment and dissentions arose in his party because he refused to use force in the battle for independence, maintaining all the time that the better way for Ireland to secure independence was by moral suasion. In 1847 he went to Italy in search of lost health, but died soon after reaching Genoa. O'Connell was an eloquent and popular speaker. His speeches were almost exclusively extemporary. Few men have been more able and conscientious in advocating political and personal independence, and none has held a warmer place in the hearts of the Irish people. He published "A Memoir of Ireland" and "Native and Saxon."

O'CONNOR (ō-kŏn'nẽr), **Thomas Power,** statesman, born in Athlone, Ireland, Oct. 5, 1848. He studied at Queen's College, Galway, and Queen's University, Cork, and engaged in newspaper writing for the London *Daily Telegraph* and other periodicals. In 1880 he was elected a member of Parliament from Galway, where he became a prominent member of the Parnell party, and served as an official of the Land League. He lectured in the United States in 1881, and in 1883 became president of the Irish National League of Great Britain. O'Connor attained a very influential position in Parliament during his long service. He is well known by his able editorship of the London *Sun.* His principal writings include "Biography of Lord Beaconsfield," "Cabinet of Irish Literature," and "The Parnell Movement."

O'CONOR, Charles, public man, born in New York City, Jan. 22, 1804; died May 12, 1884. He was admitted to the bar at the age of twenty and soon built up a successful practice. In 1848 he directed a movement in America in favor of Irish nationality. Throughout the Civil War he sympathized with the Confederate States, and afterward joined Horace Greeley in furnishing bail for Jefferson Davis. He aided in prosecuting the Tweed Ring of New York City and, in 1872, was nominated for President by the wing of the Democratic Party which refused to vote for Horace Greeley. He published "The Record of a Five-Years' Campaign Against Official Malversation."

OCONTO (ō-kŏn'tō), a city of Wisconsin, county seat of Oconto County, on Green Bay, at the mouth of the Oconto River, 145 miles north of Milwaukee. It is on the Chicago and Northwestern and the Chicago, Milwaukee and Saint Paul railroads. In its vicinity is a fertile agricultural country, which produces cereals and grasses. The noteworthy buildings include the county courthouse, the high school, the public library, and a number of fine churches. It has a large trade in lumber and merchandise. Among the manufactures are ironware, wagons, flour, furniture, and machinery. The place was settled in 1850 and incorporated in 1882. Population, 1905, 5,722; in 1920, 4,920.

OCRACOKE INLET (ō'krȧ-kōk), a narrow passage between Pamplico Sound and the Atlantic Ocean, located on the coast of North Carolina, about 25 miles southwest of Cape

Hatteras. On its north shore is Ocracoke and on its south shore is the town of Portsmouth. Dangerous shoals are on each side of the channel.

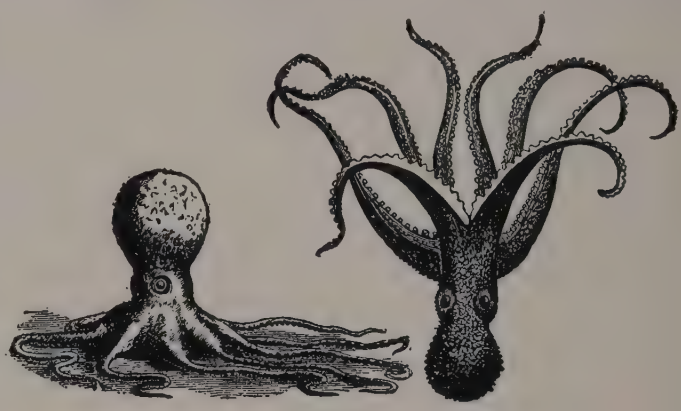
OCTAVIA (ŏk-tā'vĭ-ȧ), daughter of Caius Octavius, sister of Emperor Augustus, and wife of Claudius Marcellus. Her husband died in 41 B. C. and the following year she married Mark Antony, presumably with the view of securing a friendship between him and her brother. She possessed a high character and remarkable beauty, though these were not sufficient to induce Antony to forget his former love for Cleopatra. In 36 B. C. Antony met Cleopatra while engaged in the Parthian War, and, when Octavia brought money and troops for his assistance, he refused to meet her and bade her return to Rome. He finally divorced her in 32 B. C., but she showed a devoted fidelity by providing for the education of her children. After the death of Antony, she likewise cared for the children of Cleopatra by Antony with marked devotion. Her death occurred in 11 B. C. She was buried by the state with the highest honors. Octavia had two daughters by Antony and three children by Marcellus, and from the former descended Emperors Caligula, Claudius, and Nero.

OCTAVIANUS. See **Augustus.**

OCTAVO (ŏk-tā'vō), a term used in book binding, having reference to a sheet of paper being folded so as to make eight leaves. It is used to designate a book printed with eight leaves to the sheet and is written *8vo.* Since the size of the paper employed varies, there are different designations, as *demy 8vo, imperial 8vo,* and *foolscap 8vo.*

OCTOBER (ŏk-tō'bĕr), the tenth month in the Gregorian calendar, containing 31 days. It was so named from its position as eighth month in the Roman year. October was sacred to Mars in the mythology of Rome.

OCTOPUS (ŏc'tō-pŭs), a genus of fishes which belong to the cephalopod group. They are familiarly known as *cuttlefishes.* They have a warty, oval body and eight arms of unequal length. Forty-six species are known. Octopi are found on the Pacific coast of North America, in the Mediterranean, and other waters. They usually frequent rocky coasts, where they feed on mollusks and crustaceans. The arms or tentacles in the common octopus measure from eight to fifteen feet, while the body is about nine feet long, thus enabling the animal to spread itself to a distance of from 25 to 35 feet. Each arm has a series of suckers, by which they seize their prey and moor themselves to the bottom of the sea. In some species the weight reaches from 60 to 70 pounds, but specimens found in the tropical waters of America weight 250 pounds. The flesh has a reddish color and is useful for bait, though in some countries on the Mediterranean several species form a favorite article of human food. They have the remarkable characteristic that the color of the flesh changes somewhat with the temper of the animal, and, when pursued by an enemy,



OCTOPUS.

CRAWLING. SWIMMING.

they emit an inky substance that colors the water somewhat and enables them to evade capture. The female deposits its eggs on empty shells and seaweed, where they are guarded against enemies. Most of the species of octopi are timid, inoffensive, and solitary, but all are active and voracious.

ODD FELLOWS, Independent Order of, one of the most extensive social institutions in the world. It dates officially from 1812, when it was instituted at Manchester, England. However, the oldest lodge of Odd Fellows was organized in 1748, at Globe Tavern, London. The first lodge instituted in the United States dates from 1819 and the grand lodge of Maryland was established in 1821. The American society severed its connection with the Manchester Unity in 1842 and the headquarters for Canada and the United States are now at Baltimore, Md. It has steadily increased in membership and has connected lodges in all the continents. The membership in the United States aggregates 2,650,000. In six provinces of Canada it has about 250,000 members.

ODE, a lyrical poem of an elevated character, composed under circumstances of poetic exaltation. The Greeks gave the name ode to every short poem intended to be sung or accompanied by instruments. Among the most noted odes of antiquity are those of Pindar, Sappho, and Anacreon, all Greek writers, and those of the Roman writer Horace. Many odes have been written by modern authors after the style of Pindar, on the supposition that the Greeks admitted an absolute license of meter in poems of

this description. However, many elaborate choruses of Grecian dramatists are constructed on a scheme of metrical regularity. Among the noted odes in English literature are Dryden's "Ode for Saint Cecilia's Day," Burns's "To a Mouse," Shelley's "Ode to a Skylark," Keats's "To a Nightingale," and Tennyson's "On the Death of the Duke of Wellington." In American literature may be mentioned Lowell's "Commemoration Ode" and Bryant's "To a Waterfowl."

ODENSE (ō'thẹn-sȧ), a city of Denmark, capital of the island of Fünen, near the Odense Fiord. It is on both sides of the Odense River, has railroad and electric railway facilities, and is well improved with grading and pavements. The notable buildings include the Cathedral of Saint Canute, the Church of Our Lady, the Castle of Odense, the public library, a seminary, and the post office. Among the manufactures are sugar, glass, cigars and pipe tobacco, textiles, clothing, and machinery. It has a fine harbor, which is connected with the sea by the Odense Ship Canal, and is the center of a large export trade in cheese, butter, bacon, and produce. Odense was founded at an early date in Danish history. It is the birth place of Hansen Christian Andersen. Population, 1906, 40,547; in 1921, 42,237.

ODER (ō'dĕr), a river of Germany, rising in the Obergebirge, in Moravia. It has a northeasterly course until after it enters Germany, when it turns toward the northwest and flows into the Baltic Sea by three channels. The Oder has a length of 550 miles, drains a basin of 50,000 square miles, and serves as an important route for commercial navigation, though much expenditure of revenues was necessary to overcome several of its rapids. The valley of the Oder is highly fertile and contains great wealth. It has a number of important tributaries, including the Neisse and the Warthe. The principal cities on its banks are Stettin, Frankfort, Glogau, Breslau, Oppeln, and Ratibor. It is navigable to Breslau for vessels of fifty tons and for small craft to Ratibor. Swinemünde, on the Baltic, is the chief port used for ocean commerce.

ODESSA (ō-dĕs'sȧ), a city of Russia, in the government of Kherson, on the Black Sea, nearly midway between the mouths of the Dniester and Dnieper rivers. It has a fine location on the Bay of Odessa. The two harbors are protected by moles and afford secure protection for its large foreign trade. Among the manufactures are machinery, cotton and woolen goods, chemicals, tobacco products, flour, oil, leather, sailing vessels, soap, and utensils. Railroad connections facilitate interior trade, but the importance of Odessa is due principally to its large export commerce in sugar, flour, cereals, wool, lumber, coal, iron, flax, hemp, and merchandise.

The city is well built. Among the improvements are electric lights, street railways, stone and asphalt pavements, an extensive public school system, and a number of fine educational institutions. The University of Odessa was founded in 1865. It has 75 professors, 850 students, and a library of 160,000 volumes. The city has a number of fine churches, a public museum, several cathedrals, government buildings, public parks, and numerous monuments. It is a modern city. The first building was a Russian fortress, erected in 1793, and around it the city was built. Its prosperity dates from 1803, when its harbor and wharves were improved, and later railroad construction opened an important trade with Austria, Germany, France, and other countries toward the west. About one-fourth of the inhabitants are Jews, but there are many Turks, Greeks, and Germans. Population, 1921, 501,606.

ODIN (ō'dĭn), in Scandinavian mythology, the divinity who is accredited with the creation of the world and regarded the ruler of both earth and heaven. He is thought to have his principal seat in Asgard, where two ravens, known as Hugin and Munin, the personification of thought and memory, bring him tidings of all events which occur on earth. He is assigned supreme power over the fortunes of war. When governing military contests or deciding in regard to the valor of warriors, he is seated in his court in Valhalla, where he is joined by worthy warriors after their decease. It is related that, while drinking from Mimur's fountain, he lost an eye, but was recompensed by being converted into the wisest god, and later he secured Frigga for his queen. His Germanic name is Woden and from it the fourth day of the week, Wednesday, was named. Odin ruled originally in Scythia, near the Black Sea, but was driven out of his territory and conquered Northern Europe and Scandinavia.

ODOACER (ō-dō-ā'sẽr), the first ruler of Italy after the downfall of the Western Empire, born in the region of the Middle Danube about 434; slain March 15, 493. He descended from German parents, his father being Edico, chief of the Scyrri tribe. It is thought that he entered the service of the allied Germanic tribes about 464 and later served for a time under Attila, King of the Huns. Soon after he became chief of a formidable confederation of barbarians. He led a vast horde of barbarians against Romulus Augustulus, whom he defeated in 476, and at once succeeded as King of Italy the last of the Roman emperors. As a matter of policy he wrote a letter to Emperor Zeno, ruler of Byzantium, declaring that he had confidence in the civil and military integrity of his government, and in turn the Byzantine emperor conferred upon him the title Patricius. Odoacer established his capital at Ravenna, where he was attacked repeatedly by Theodoric, King of the Ostrogoths, and after a number of years was compelled to surrender his army to

his opponents, who immediately assassinated him. The reign of Odoacer was wise and vigorous, but the extreme factional divisions of his time made it impossible to unite successfully the people into one nation for the practice of the arts of peace.

ODYSSEY (ŏd'ĭs-sy). See **Homer.**

OEDIPUS (ĕd'ĭ-pŭs), a popular hero of Greek mythology, son of King Laius of Thebes and Jocasta. An oracle told the king that he would perish by the hand of his own son, and, to escape such a fate, he determined to destroy the infant. Accordingly the babe's feet were bound together and he was handed to a servant with instructions to expose him on Mount Cithaeron, but, instead, the servant gave the child to a shepherd, who later gave him in charge of the Corinthian king, at whose palace he was reared to manhood. Oedipus supposed that he was the son of the king, but, when informed at a banquet that he was not, he repaired to Delphi to consult the oracle, and there was informed that he was fated to kill his father and to marry his own mother. Dismayed by the information he decided to proceed to Boeotia. While en route he met a chariot on the highway, and, when ordered to give all the way, a quarrel ensued in which the occupant of the chariot was killed, and Oedipus fled from the spot without learning that the slain man was his father, King Laius of Thebes. The kingdom of Thebes was offered to the person who would solve the riddle of the Sphinx, and the successful contestant was likewise to become the husband of the queen. When Oedipus was asked, "What being has four feet, two feet, and three feet, and only one voice, but whose feet vary, and when it has the most is weakest?" he answered promptly, "Man." The solution being correct, the Sphinx fell from her foundation and he became the King of Thebes and the husband of Jocasta.

The country enjoyed great prosperity and tranquility under Oedipus. Four children were born to the union, two sons, Polynices and Eteocles, and two daughters, Ismene and Antigone. Later the country was devastated by a pestilence, and, when Oedipus consulted the oracle for the author of the crime, he was given this answer: "Thou thyself are the murderer of the old King Laius, who was thy father; and thou art wedded to his widow, thy own mother." Horrified at this revelation, he deprived himself of his own sight and Jocasta hanged herself in despair. Oedipus became a homeless outcast, but was never forsaken by his daughter Antigone, who cared for him with faithful devotion in the grove of Eumenides. Poets have used the story of Oedipus to illustrate the power of fate over man. It was made the subject of tragedies by Dryden, Voltaire, Corneille, Chénier, and many other noted writers.

OEHLENSCHLÄGER (ē'lẹn-shlă-gẽr), **Adam Gottlob,** noted poet, born in Copenhagen, Denmark, Nov. 14, 1779; died Jan. 20, 185(
He spent his early life at the royal palace o
Fredericksburg, where his father was steward
and attended several educational institutions o
Copenhagen. His first verses were written whe
he was twelve years old. In 1803 he publishe
a volume of poetry, in which appeared the pla
"Eve of Saint John." He mastered the Germa
language by studying and traveling in German
and later translated many of his works into tha
tongue. Among his chief writings are "Axe
and Valborg," "Palnatoke," "Canute the Great,
"Land Found and Lost," "Gods of the North,
and "Varangians in Constantinople." He mad
many translations into the Danish from variou
European languages.

OELWEIN (ōl'wīn), a city of Iowa, i
Fayette County, about 56 miles west of Dubuqu
It is on the Chicago Great Western and th
Chicago, Rock Island and Pacific railroads. Th
surrounding country is fertile, producing cereal
vegetables, and fruits. The chief buildings in
clude the high school, the public library, and
number of churches. It has a growing trade i
live stock and merchandise. Extensive railroa
shops are located here. Among the manufac
tures are cigars, earthenware, and machinery
The place was named after August Oelwei
who settled here in 1875, and was incorporate
in 1888. Population, 1905, 5,632; in 1925, 8,05

OETA (ē'tà), a group of mountains i
Greece, forming the southern boundary of Thes
saly. The pass of Thermopylae is at the east
ern extremity of these mountains, which for
a natural barrier between northern and centra
Greece.

OFFENBACH (ŏf'fẹn-bäk), a city of Ger
many, in the Grand Duchy of Hesse, four mile
east of Frankfort. It is finely situated on th
Main and a number of railways. The chie
buildings include an old palace, the townhal
and several fine schools and churches. Th
streets are straight and well paved with ston
and macadam. An extensive system of electri
railways furnishes communication with Frank
fort and other cities. Among the manufacture
are pipe tobacco and cigars, textiles and carpet
leather and rubber goods, chemicals, soap, an
machinery. It was a place of refuge for man
French Protestants in the 17th century. Popu
lation, 1905, 59,765; in 1920, 75,593.

OFFENBACH, Jacques, musical compose
born in Cologne, Germany, June 21, 1819; die
Oct. 5, 1880. He descended from Jewish pa
ents, studied music from an early age, and i
1833 entered the Paris Conservatoire as a stu
dent. In 1834 he was admitted as a violonce
list to the Opéra Comique and soon attained t
much popularity with Parisian audiences. H
became conductor of the Théâtre Français i
1847 and subsequently leased the Théâtre Comt
which he reopened as the Bouffes-Parisien
Most of his operas are classed as comic an
include numerous popular productions, man

of which still hold a high place in European and American countries. Among the most noted are "La Belle Helene," "Genevieve of Brabant," "Grand Duchesse," "Madame Favart," "Princess of Trebizonde," and "Orphee aux Enfers."

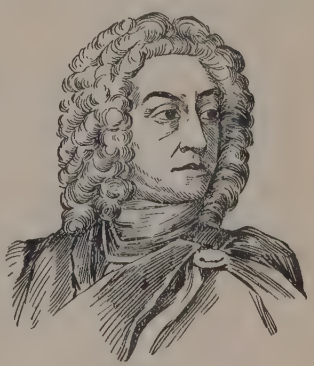
OG, King of Bashan, one of the two kings of the Amorites who successfully opposed the invasion of the Israelites. However, his threescore cities were destroyed after his defeat at Edrei, when his territory was given to the half tribe of Manasseh. It is reputed that he was a giant in stature.

OGDEN (ŏg'dĕn), a city of Utah, in Weber County, at the confluence of the Ogden and Weber rivers, 37 miles north of Salt Lake City. It is on the Denver and Rio Grande, the Union Pacific, the Southern Pacific, and the Oregon Short Line railroads. The site is a beautiful tract with an elevation of 4,325 feet above the sea. Among the improvements are electric lighting, waterworks, pavements, and street railways. It has manufactures of canned fruit, clothing, flour, brooms, dairy products, machinery, ironware and earthenware. The architecture is largely of brick and stone. It is the seat of a military academy, the Ogden Academy, and the University of Utah. Ogden has a fine Mormon tabernacle and a number of churches. The surrounding country is agricultural and mining, producing cereals, grasses, fruits, and precious minerals. Its healthful climate makes it a favorite resort for invalids and tourists. In the vicinity of Ogden are thermal springs of value in the treatment of rheumatism, scrofula, and other diseases. The place was first settled in 1848. It was platted as a town in 1850 and was incorporated the next year. The first settlers were Mormons who came here under the direction of Brigham Young. Population, 1900, 16,313; in 1920, 32,804.

OGDENSBURG (ŏg'dĕnz-bûrg), a city of New York, in Saint Lawrence County, on the Saint Lawrence River, seventy miles below Lake Ontario. The place has transportation facilities by steamship and by the Rutland and the New York Central railroads. It is a United States port of entry and has a large trade in lumber, grain, and other produce. Among the manufactures are leather goods, flour, machinery, lumber products, and hardware. Among the noteworthy buildings are the Federal customhouse, the public library, the city hall, the State armory, the Ogdensburg Free Academy, the Saint Laurence Hospital, and the Roman Catholic cathedral. It has fine parks, including Crescent, Grove, Hamilton, Mansion, and Riverside parks. The public utilities include systems of waterworks, sanitary sewerage, and electric street railways. It was settled in 1749 and incorporated in 1817. The British captured it in 1813. Population, 1905, 13,179; in 1925, 17,047.

OGLESBY (ō'g'lz-bỹ), **Richard James,** statesman, born in Oldham, Ky., July 25, 1824; died in Elkhart, Ill., April 24, 1899. He was the son of a farmer, removed to Illinois in 1836, and in 1845 was admitted to the bar in Springfield. He enlisted at the beginning of the Mexican War and participated in the battles of Cerro Gordo and Vera Cruz. From 1849 to 1851 he worked in California as a gold seeker and returned in the latter year to Illinois with $4,500. He became a State senator in 1860, but soon after resigned to enter the Union service in the Civil War, and took part in the battles of Fort Henry, Fort Donelson, Shiloh, and Pittsburg Landing. At the siege of Corinth he was severely wounded and was off duty until in April, 1863. The following year he resigned his command, after having been made major general. In 1864 he became Governor of Illinois and was reëlected in 1872, and served as a Republican in the United States Senate from 1873 to 1879. He was elected Governor a third time in 1884 and, after the expiration of his term, in 1889, retired to his farm near Elkhart.

OGLETHORPE (ō'g'l-thôrp), **James Edward,** founder of Georgia, born in London, England, Dec. 21, 1696; died there Jan. 30, 1785. He was a British army officer, served as a member of Parliament for thirty years, and in 1732 secured a grant of land for the purpose of establishing a colony for unfortunate debtors. In 1733 he founded Savannah, Ga. The settlement was fairly prosperous and he induced a number of German Protestants to seek refuge there. Parliament made a grant of $50,000 to further the enterprise. In 1741 he commanded an expedition against the Spanish settlements at Saint Augustine, but was repulsed, and the following year his colony was attacked unsuccessfully by a Spanish force. He returned to England in 1743, where, in 1752, he resigned the charter of Georgia to the crown.



JAMES E. OGLETHORPE.

OGOWE (ō-gō-wā'), or **Ogobay,** a river of West Africa. It rises near the southern boundary of Cameroon and, after a course of about 400 miles toward the southwest, flows into the Atlantic Ocean, near Cape Lopez. It is characterized by a number of rapids and cataracts and enters the ocean by an extensive delta. In the dry season it becomes a narrow current, but during the rainy period it assumes such an immense size that it was long thought to be one of the leading arteries of Africa. Du Chaillu explored the river in 1857, and soon after a

number of French stations and missions were established in its valley. A large part of the Ogowe basin is fertile, producing tobacco, fruits, cereals, and grasses.

OHIO (ō-hī'ō), a large river of the United States, formed at Pittsburg, Pa., by the junction of the Monongahela and Allegheny rivers. After a course of 975 miles toward the southwest, it joins the Mississippi at Cairo, Ill. The river is navigable in its entire course from Pittsburg, being 600 yards wide at that city, and it drains a basin of 214,000 square miles. It forms the southern boundaries of the states of Ohio, Indiana, and Illinois, the northern boundary of Kentucky, and the northwestern boundary of West Virginia. The principal northern tributaries include the Muskingum, Scioto, Miami, and Wabash, and its principal southern affluents are the Great Kanawha, Big Sandy, Licking, Kentucky, Green, Cumberland, and Tennessee. The important cities on its shores include Evansville, New Albany, Louisville, Cincinnati, Portsmouth, Marietta, Wheeling, Cairo, and Pittsburg. As a waterway the Ohio is of vast importance and its valley is noted for great fertility. It is the largest eastern tributary of the Mississippi.

OHIO, a north central state of the United States, popularly called the *Buckeye State.* It is bounded on the north by Michigan and Lake

OHIO.

1, Columbus; 2, Cincinnati; 3, Cleveland; 4, Toledo; 5, Dayton; 6, Canton. Chief railroads shown by dotted lines.

Erie, east by Pennsylvania and West Virginia, south by West Virginia and Kentucky, and west by Indiana. The length from east to west is 223 miles and the width from north to south, 210 miles. The area is 41,060 square miles, of which 300 square miles are water surface.

DESCRIPTION. As a whole, the State has an undulating surface, being quite hilly in the northeastern part, though its general elevation is only from 425 to 1,540 feet above sea level. A ridge crosses the State from the northeastern corner to about the middle of the western boundary, this being the divide between the basin of the Ohio River and that of the Great Lakes. Near Bellefontaine, in Logan County, is the greatest altitude. Bluffs about 600 feet high extend along the Ohio River. These bluffs are penetrated by many short and rapid streams.

The drainage is principally toward the south into the Ohio River, which forms the entire southern boundary, separating the State from West Virginia and Kentucky. Into it flow the Great Miami, the Little Miami, the White, the Scioto, the Hocking, and the Muskingum, all of which have numerous tributaries. The northern part is drained into Lake Erie by the Maumee, the Sandusky, the Cuyahoga, and the Grand. Maumee Bay and Sandusky Bay extend into the northern coast. A number of islands in Lake Erie belong to the State, including Catawba, Kelly's, and Put in Bay.

The climate is temperate and healthful, though sudden changes in the temperature are quite frequent. The extremes of both heat and cold are influenced and shortened by constantly varying winds. In the north the temperature is modified by the presence of Lake Erie, and here the winters are quite cold and severe, but the southern half is somewhat warmer. The temperature ranges from 30° below zero to 98° or even 105° above. In the northern part the mean temperature is 48° and in the south it is 54° degrees. All parts of the State have an abundance of rainfall, which is evenly distributed throughout the year, being 38 inches annually. Considerable snow falls during the winter, but it does not lie long on the ground in the southern part.

MINING. Bituminous coal of an excellent quality is abundant in the southern and eastern parts of the State, where the veins have a thickness of four to fifteen feet. It is estimated that these fields cover an area of 12,500 square miles. The annual output has been increased considerably in the past decade and is given at 30,500,000 tons. Hocking, Athens, Jackson, Guernsey, Belmont, and Perry counties have extensive mines. In the output of salt the State takes high rank. Petroleum of a good quality is found in two fields, one in the southeastern and the other in the northwestern part, the former being known as the Eastern and the latter as the Lima fields. In the output of petroleum the State ranks ninth, with a yield of 8,500,000 barrels per annum. Natural gas of an excellent quality is found in the oil-producing districts. Ohio has first rank in the value of clay products, the deposits of clays including those suitable for tile, brick, and pottery. Granite, sandstone, and limestone are well distributed and extensively quarried for building purposes. Stones suitable for lime, grindstones,

and whetstones are worked extensively. Iron ore was formerly mined to a considerable extent, but the output has decreased on account of large importations from Michigan and Minnesota. Other minerals include gypsum, bromine, natural cement, and mineral waters.

AGRICULTURE. About 94 per cent. of the land area is in farms, which average 88 acres. The land is farmed with considerable care and in many places commercial fertilizers are used to maintain a high degree of fertility. Corn, wheat, and hay are the leading crops, and in the output of these the State holds a very high rank. Other products embrace oats, potatoes, tobacco, barley, rye, and buckwheat. It takes fourth rank in the cultivation of fruits grown in the Temperate Zone, the annual yield of apples alone being 10,250,000 bushels. Vegetables of all kinds thrive. Large quantities of cabbage, tomatoes, and sweet corn are grown for canning purposes. Darke and Montgomery counties are noted for the large yield of tobacco.

Stock raising is favored by large areas of grazing lands and a suitable climate. Dairying interests are well developed and dairy cows of a high grade are grown extensively. Many cheese factories are managed on the coöperative plan, but much of the product is marketed as milk and butter. Meat cattle are grown in large numbers. In sheep raising the State for a long time held first rank. Other live stock includes swine, horses, mules, and poultry. Many farms have small preserves of forests, made up largely of maple, ash, walnut, chestnut, spruce, oak, and beech trees. These tracts, though covered with a prolific growth of trees, furnish fine pasturage.

MANUFACTURES. In the value of manufactured products Ohio usually takes fifth rank, being exceeded only by Illinois, Pennsylvania, Massachusetts, and New York. In the output of iron and steel products it is second only to Pennsylvania. Cleveland is the most important manufacturing center, but it is followed closely by Cincinnati, and a high place is held by Toledo, Columbus, Dayton, and Akron. Foundry and machine shop products, flour and grist, and cured and packed meats hold high rank in value and quantity. Automobiles, motor accessories, cash registers, cut glass and rubber goods are produced in large quantities. Ohio has first rank in the value of stone and earthen products, such as brick, tile, and pottery. Lumber products, especially furniture and railway cars, are made in large quantities. Other manufactures include pipe tobacco and cigars, rubber tires, wagons, soap and candles, clothing, roof tile, shoes, paper and wood pulp, and products from printing and publishing.

TRANSPORTATION AND COMMERCE. The State is highly favored in transportation facilities, being conveniently located on Lake Erie and the Ohio River. These afford direct water connections with the Atlantic coast, the Gulf of Mexico, and the states lying on the Great Lakes. The Ohio Canal extends from Cleveland to Portsmouth; the Hocking Canal, from Carroll to Nelsonville; the Miami and Erie Canal, from Cincinnati to Toledo; and the Walhonding Canal, from Rochester to Roscoe. Electric railways are operated in many parts, and it is possible to cross the State in several directions by these lines. The State has 9,250 miles of railroads and is crossed by the principal transcontinental lines passing from the Atlantic seaboard to Chicago and Saint Louis. The longer lines include those of the New York Central, the Nickel Plate, the Baltimore and Ohio, the Erie, the Pennsylvania, the Wabash, the Toledo and Ohio Central, the Wheeling and Lake Erie, and the Cleveland, Cincinnati, Chicago and Saint Louis. Cleveland and Cincinnati are the largest commercial and jobbing centers. Ohio exports large quantities of coke, brick, coal, steel, iron, books, clothing, grain, fruits, and machinery. It imports raw cotton and other materials for manufacturing.

GOVERNMENT. The present constitution was adopted by popular vote in 1851. It vests the chief executive authority in the governor, lieutenant governor, secretary of State, treasurer, attorney-general, and school commissioner, all elected for two years, and an auditor elected for four years. The gas commissioner, State and law librarian, commissioner of railroads and telegraphs, and a number of other officials are appointed by the Governor. Legislative authority is vested in the Legislature, which consists of a senate and a house of representatives. The members in both bodies are apportioned by counties or districts according to population and are elected for terms of two years. The supreme court constitutes the highest judicial authority and subject to it are the circuit courts, courts of common pleas, courts of probate, justices of the peace, and other courts that may be established by the Legislature. All the judges are elected by popular vote. Local government is administered by county, municipal, and township officers.

EDUCATION. Education is under the State, county, and district superintendents. The rate of illiteracy is 2.8 per cent.; but among native whites it is only .9 per cent.; among foreign whites, 8.1 per cent.; and among the colored people, 12.6 per cent. School attendance is compulsory between the ages of eight and fourteen years. Considerable progress has been made in the centralization of rural schools, giving outlying districts the advantage of graded and high school courses. Ohio has more high schools than any other State, but the high school attendance is greater in New York. Normal schools for the training of teachers are maintained at Akron, Athens, Cleveland, Columbus, Dayton, Oxford, and Toledo, and some of the universities maintain courses in pedagogy. Columbus is the seat of the Ohio State University, in which the system

of public instruction culminates. Among the higher institutions of learning are the Ohio University, Athens; the Ohio Wesleyan University, Delaware; the Mount Union College, Alliance; the Calvin College, Cleveland; the University of Wooster, Wooster; the Western Reserve University, Cleveland; the Oberlin College, Oberlin; the Marietta College, Marietta; the Hiram College, Hiram; the Saint Xavier College, Cincinnati; the Twin Valley College, Germantown; the Buchtel College, Akron; the Heidelberg University, Tiffin; the Wittenberg College, Springfield; the University of Cincinnati, Cincinnati; and the Hebrew Union College, Cincinnati.

The benevolent and penal institutions are under the management of a State board of charity, consisting of six members, who are appointed by the Governor. These institutions include State hospitals at Columbus, Cleveland, Athens, Dayton, Massillon, and Toledo, an institution for feeble-minded at Columbus, a soldiers' and sailors' orphans' home at Xenia, an institution for the blind at Columbus, the penitentiary at Columbus, the State reformatory at Mansfield, the boys' industrial school at Lancaster, the girls' industrial home at Delaware, the soldiers' and sailors' home at Sandusky, and institutions for the deaf, blind, and dumb at Columbus. Prisoners in the penitentiary are employed to some extent under the contract system, but they remain under the complete control of the State.

INHABITANTS. Large settlements were made in Ohio by immigrants from Pennsylvania and the eastern states. Many Germans from Switzerland and Germany were attracted to the State and this class constitutes more than half of the people of foreign birth. It is more densely populated than any State west of the Allegheny Mountains, having an average of 141 persons to the square mile. Columbus, on the Scioto River, is the capital. Other cities include Cleveland, Cincinnati, Toledo, Dayton, Youngstown, Akron, Springfield, Canton, Zanesville, Findlay, Sandusky, Hamilton, Lima, Newark, Mansfield, Steubenville, Portsmouth, Chillicothe, East Liverpool, Ironton, Tiffin, and Massillon. In 1900 it had a population of 4,157,545. This included a total colored population of 97,341, of which 371 were Chinese and 96,901 Negroes. Population, 1920, 5,759,368.

HISTORY. Ohio was formed from the Northwest Territory. French fur traders visited the region as early as 1670 and the following year it was formally claimed as a possession of France. Both France and England made claim to the whole region at the time of the French and Indian War and the treaty of Paris, in 1763, gave the region as far west as the Mississippi to the English. The southern part of the State was claimed by Virginia and the northern part by Connecticut, and in 1783 the former ceded its interest to the general government, while the latter made a similar cession in 1786, but retained ownership of the lands that afterward became known as the Western Reserve. In 1787 an act was passed by Congress for the government of the Northwest Territory and General Putnam founded a settlement at Marietta, in 1788. Settlements followed rapidly until in 1791, when a war broke out with the Indians, who were finally subdued by General Wayne in 1794. Ohio was set off under a separate government in 1800 and on Feb. 19, 1803, it was admitted as a State.

The State gave loyal support to the Union in the War of 1812, when the British were repulsed at Fort Meigs. Although many Indians joined the British, the region was ably defended by William Henry Harrison. The contest ended in the State by Perry's victory on Lake Erie. During the long interval of peace many canals were constructed to connect the natural waterways and railroad building began with much vigor before the Civil War. The State furnished a large number of troops to maintain the Union against the Confederacy, including many leaders of distinction, such as Sherman, Rosecrans, and McDowell. It has vied with Virginia in furnishing presidents of the Union, Grant, Hayes, Garfield, Benjamin Harrison, McKinley, and Taft being native Ohioans.

OHIO STATE UNIVERSITY, a coeducational institution of higher learning at Columbus, Ohio. It was founded in 1870 as the Ohio Agricultural and Mechanical College and assumed its present name in 1878. The institution is supported by special appropriations of the General Assembly and by permanent annual grants from the State and Federal governments. It embraces the six colleges of agriculture and domestic science; arts, philosophy, and science; pharmacy; engineering; law; and veterinary science. Admission is based upon examinations or certificates from accredited high schools and colleges. The property of the university is valued at $3,975,000 and the annual income is $1,250,000. It has a faculty of 723 instructors, a library of 275,000 volumes, and an attendance of 10,400 students.

OHM (ōm), **Georg Simon,** eminent physicist, born in Erlangen, Germany, March 16, 1787; died July 7, 1854. He studied at Nuremberg and Munich, giving particular attention to galvanism. In 1817 he became professor of mathematics at the Jesuit College in Cologne and in 1833 was chosen to a like position at Nuremberg. Subsequently he was professor of physics in Munich. He is the discoverer of the important law in electricity that the current which passes through any circuit is directly proportional to the electro-motive force acting on that circuit, and inversely proportional to the resistance of the circuit. The *ohm,* the unit of resistance to the passage of electricity that approximately equals the resistance offered by two miles of ordinary trolley wire, was named after him. He published a number of excellent works on the sciences, among them "Chain of Gal-

vanism," "Basis of Physics," and "Elements of Analytical Chemistry."

OHM'S LAW. See **Ohm, Georg Simon.**

OIL CITY, a city of Pennsylvania, in Venango County, on the Allegheny River, 132 miles north of Pittsburg. It is on the Erie, the Pennsylvania, an electric, and the New York Central railroads. The surrounding country is a productive oil and coal region. It has a large trade in oil and merchandise. Among the manufactures are engines, steam boilers, tile, pipes, machinery, tanks, cigars, hardware, and refined oils. The noteworthy buildings include the Carnegie Free Library, the Oil Exchange, the high school, and the city hospital. It has Hasson's and Smithman's parks. Waterworks, pavements, electric lighting, and street railways are among the improvements. The place was settled in 1825 and owes its prosperity to the discovery of vast oil deposits in 1859. It was incorporated as a city in 1874. Population, 1900, 13,264; in 1920, 21,274.

OILCLOTH, a cloth treated with oil or paint and used for making garments, covering for floors, and various other purposes. Jute or burlap are used in making the canvas which forms the basis of oilcloth. It is sized by treating with varnish, liquid glue, or rye flour, the canvas being passed through a trough, after which the surplus sizing is removed by pressure between two rollers. It is then rubbed down with pumice stone and given a coat of paint. The better grades are rubbed down with pumice stone several times, after which they are colored by machinery, dried, and varnished. Oilcloth is sold on the market in different widths and many grades. The heavier and more durable kinds are used for floor covering.

OIL PALM. See **Palm Oil.**

OILS, a generic term used to describe various neutral liquids, usually of either animal or vegetable origin, but sometimes of mineral origin. The oils are lighter than water. They are insoluble in water, but sometimes soluble in alcohol and always in ether. They take fire when heated in air and give off a luminous flame when burning. Animal and vegetable oils are divided according to their properties into volatile or essential oils, and fatty or mixed oils. *Essential oils* are obtained chiefly by extracting the volatile principles of plants by distillation, and are used principally in medicine and perfumery, though they also enter extensively into the manufacture of varnishes and serve in the preparation of coloring matter. Chemically they are composed of hydrocarbons, or mixtures of hydrocarbons with compounds of hydrogen, carbon, and oxygen. Among the many essential oils are those known as the oils of cinnamon, anise, peppermint, nutmeg, mint, lime, lemon, clove, lavender, thyme, orange, bergamot, marjoram, cajeput, chamomile, caraway, fennel, and many others.

Fatty oils penetrate paper and like substances. They communicate to paper a partial transparency and leave a permanent translucent grease spot. The fatty oils from animals are simply the liquid portions of animal fat, but those of vegetable origin are obtained chiefly from seeds by pressure. These oils are composed principally of glycerids of palmitic, stearic, and oleic acids, and are subdivided into drying and nondrying oils. The *drying oils* are of vegetable origin and slowly absorb oxygen from the air, forming a varnish, and are used in the manufacture of paints and varnishes. The *nondrying oils* decompose on exposure to the air, when they change to a darker color and take on a disagreeable smell and taste. They are used as food, in medicine, in soap making, and for many other purposes. Among the principal drying oils are the oils of walnut, linseed, candle nut, hemp, poppy, sunflower, sesame, and madia. The nondrying oils include those made of cotton seed, olive oil, castor oil, rape oil, colza oil, and groundnut oil. Among the *animal oils* are included lard, butter, tallow, sperm oil, cod-liver oil, seal oil, neat's-foot oil, porpoise oil, train oil, shark oil, and many others.

The *mixed oils* enter largely into the foods and medicines and are common sources of artificial light. They are also of service as lubricants. Butter is obtained from milk, tallow from the fat of sheep and cattle, and lard from that of swine. Neat's-foot oil is secured by extracting the fatty substances from the feet of cattle. *Mineral oils* form a class somewhat by themselves and include oils distilled from shale, peat, and other mineral substances. This class of oils also includes petroleum. They are thought to have been formed by the decomposition of vegetable and animal matter, though some writers regard petroleum of purely mineral origin. Mineral oils are composed largely of carbon and hydrogen.

OIL WELLS. See **Petroleum.**

OJIBWAYS (ō-jĭb'wāz), or **Chippewas,** a tribe of Algonquin Indians found in the region of Lake Huron and Lake Superior by the early settlers of America. Their number was reduced greatly by warring with neighboring tribes, particularly with the Iroquois and Sioux. They sided with the French against the English, later joined Pontiac in his wars, and during the Revolution sided with the British. Peace treaties were made with them in 1785 and 1789. Subsequently they joined the uprising of the Miamis, but were reduced by General Wayne, and made another peace treaty in 1795. In the War of 1812 they were again unfriendly, but in 1817 they relinquished all their lands in Ohio, and by 1851 most of the tribe had been moved west of the Mississippi. This Indian tribe includes many who have advanced considerably in industrial and educational arts. Their history from the early settlement of America has been written in an interesting manner by several of their scholars.

OKA (ȧ-kȧ′), a river of Central Russia. It rises 35 miles south of the city of Orel and, after a tortuous course toward the northeast, joins the Volga at Nijni Novgorod. The Oka is 950 miles long, flows through one of the most fertile regions of Russia, and is an important commercial route for 600 miles.

OKAPI (ō-kä′pĭ), an animal discovered in 1899 by Sir Harry Johnston in the Semliki forest of the Congo. It belongs to the giraffe family, is 4½ feet high at the withers, and is about the size of an ox. While the head resembles that of the giraffe, it has no external horns, the tail and neck are short, and the fore legs are considerably elongated. The color of the animal is peculiar, the jaws and cheeks being yellowish white, the neck dark brown, the forehead chestnut, the shoulders ranging from black to vinous red, the tail chestnut, and the belly blackish. Black stripes band the legs, which are white or cream colored with tinges of orange. The ears are large and colored a deep red chestnut fringed with black. Reports published recently agree that the okapis live in pairs in the densest forests, chiefly in the northern Congo basin, where they are hunted for their skins and flesh by the natives.

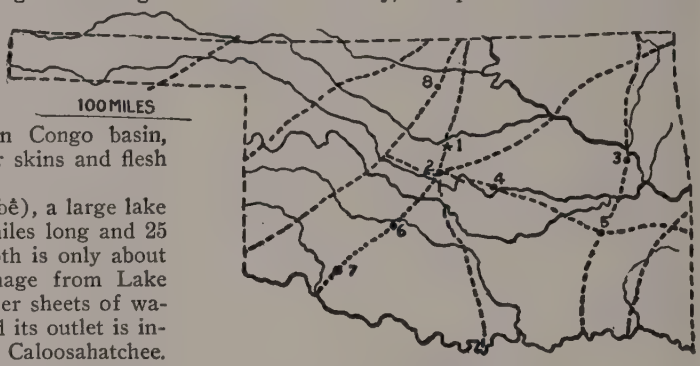
OKEECHOBEE (ō-kē-chō′bē), a large lake in southern Florida, being 40 miles long and 25 miles wide. The maximum depth is only about 12 feet. It receives the drainage from Lake Kissimmee and a number of other sheets of water by the Kissimmee River, and its outlet is into the Gulf of Mexico by the Caloosahatchee. Within the lake are a number of islands, and in the vicinity are extensive everglades. Much of the region has been redeemed by an extensive system of drainage.

OKHOTSK (ō-kōtsk′), **Sea of,** an Asiatic inlet from the Pacific Ocean, situated east of Siberia and west of Kamchatka. It is partly inclosed by the Kurile Islands. The Gulf of Tartary joins it with the Japan Sea. It is 990 miles long and 495 miles wide. Within it is the large island of Saghalien. The principal inflow of fresh water is by the Amur River. It has extensive fisheries, but its commerce is limited on account of the extremely cold climate. It is quite deep, has no shoals or sand banks, and is subject to fogs and storms.

OKLAHOMA (ōk-lȧ-hō′mȧ), a south central state of the United States, popularly called the *Boomer State*. It is bounded on the north by Colorado and Kansas, east by Missouri and Arkansas, south by Texas, and west by Texas and New Mexico. Its extreme length from east to west is 585 miles; greatest breadth, 210 miles. The area is 70,057 square miles, including a water surface of about 400 square miles.

Description. The surface is an undulating plain, sloping generally toward the southeast. The lowest land is in the southeastern part, where the Red River forms the Texan boundary, and the surface rises toward the western boundary, where the altitude is 5,000 feet above the sea. Ranges of hills enter the State from Arkansas and characterize the portion lying south of the Canadian River as somewhat broken and hilly. The Wichita Mountains are in the southwestern part, chiefly in Kiowa and Comanche counties, where the summits rise about 1,000 feet above the surrounding plains. Along the streams are ranges of hills and bluffs, and these are made up largely of a reddish-colored clay. Sandy tracts characterize the northwestern part, especially the region included in what was formerly known as *No Man's Land*, which is now divided into the counties of Beaver, Texas, and Cimarron.

All of the drainage belongs to the Mississippi system and is carried by the Arkansas and Red rivers. The Red River forms the entire southern boundary, except that of the western



OKLAHOMA.

1, Guthrie; 2, Oklahoma City; 3, Muscogee; 4, Shawnee; 5, McAlester; 6, Chickasha; 7, Lawton; 8, Enid. Chief railroads shown by dotted lines.

prolongation. It receives the inflow from the Washita and the North Fork of the Red rivers. About two-thirds of the State is drained by the Arkansas and its tributaries. The Arkansas enters the State from Kansas, flows through the northeastern corner, and enters the State of Arkansas at Fort Smith. The central part of the State is drained by the Canadian, which crosses the border from Texas and joins the Arkansas near the eastern boundary. In the northern part is the Cimarron River, which flows through the western prolongation, thence passes through a part of Colorado and Kansas, thence reënters Oklahoma, thence reënters Kansas, and thence flows through Oklahoma in a southeasterly direction and joins the Arkansas a short distance above Tulsa. The Salt Fork of the Arkansas enters the State from Kansas and joins the Arkansas on the southeastern border of Kay County. None of the rivers within the State is navigable, being low and shallow during the summer, but most of them are high in the spring. The State has no lakes of importance.

The climate is favorable and healthful and in

the eastern part it is especially delightful, being less liable to sudden changes than in the western part. Severely cold weather rarely occurs and the winters are mild. Rainfall is greatest in the eastern part, where it averages about 56 inches, and the rainfall for the State is 31 inches. In the extreme western part the rainfall is scant, usually about 22 inches, and irrigation is employed to some extent. The mean temperature for the State is 59.5°, the extremes ranging from a few degrees below zero to 98° and even 112° above.

Mining. Oklahoma has an abundance of mineral wealth, but mining has not been developed to the extent of its possibilities. Petroleum and natural gas are produced in large quantities. Extensive bituminous coal fields abound in the eastern and southern parts, especially in the vicinity of McAlester. Large deposits of valuable granite are found at Granite and in other localities, where quantities are quarried for monuments and building purposes. Coal takes rank as the second important product of the mines, yielding about 3,500,000 tons per year, and a considerable amount of the output is shipped to adjoining states. Limestone, sandstone, and clays are abundant. Other minerals include gypsum, salt, iron, copper, ocher, glass sand, and mineral waters. Asphalt of a good quality is obtained in the eastern part, from lands controlled largely by the Choctaw and Chickasaw Indians.

Agriculture. The interests in agriculture and stock raising are extensive. At present the farms average 190 acres and the variety of crops grown is larger than in most of the states. Corn and wheat represent the larger acreage. Kaffir corn is grown extensively in the arid regions of the western part. Cotton is cultivated throughout the southern section and the yield per acre is in excess of that of any other State. Considerable profit is obtained from the cultivation of tobacco, peanuts, broom corn, castor beans, potatoes, and fruits. Barley, oats, flax, and millet yield large returns. The fruits include peaches, apples, pears, plums, and cherries and much of the product is shipped fresh to northern markets.

Cattle raising has flourished since the region was opened for settlement, but the larger ranches are located in the western part. Cattle represent the largest interests in the animal industry. This class of stock is grown chiefly for meat, but dairy interests are developing rapidly. Horses of a fine grade are grown in large numbers. In raising swine and sheep the State takes high rank and it has considerable interests in rearing mules. Poultry of all kinds is grown with profit. A large part of the live stock is shipped to the markets without the State, the larger part going to Kansas City, Mo.

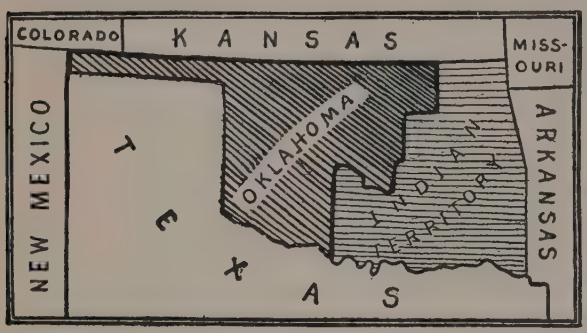
Manufactures. Material development has been made in manufacturing the past several years, especially in flouring and grist milling, the products of which have a value of $401,000,000 per year. The southern and eastern parts have extensive lumber milling interests, where large quantities of oak, hickory, elm, cotton wood, ash, and walnut forests are found. The cotton-seed oil and cake produced make up a material item and considerable quantities of machinery, earthenware, pipe tobacco and cigars, and clothing are made. Blankets, baskets, moccasins, and wearing apparel are made by the Indians. Coke is made from the coal and oil refineries prepare for market a part of the petroleum output.

Government. The present constitution was ratified by the people at a special election in 1907, in which year the former divisions of Oklahoma and Indian Territory were admitted as a single State. It vests the executive authority in the governor, lieutenant governor, secretary of State, auditor, treasurer, attorney-general, State examiner and inspector, chief mine inspector, superintendent of public instruction, commissioner of labor, commissioner of charities and corrections, and commissioner of insurance, each being elected for terms of four years, but the governor, secretary, auditor, and treasurer are not eligible immediately to succeed themselves. Legislative authority is vested in a General Assembly, which consists of a senate of 44 members elected for four years and a house of representatives of 109 members elected for two years. Sessions of the Legislature are held biennially, beginning on the Tuesday after the first Monday in January. A supreme court, district courts, county courts, and such other courts as may be established by law comprise the judicial department. Five judges elected for six years constitute the supreme court. Local government is administered by counties, municipalities, and townships. The constitution provides that a day's work shall consist of eight hours in all cases of employment by the State or any county or municipality, and the contracting of convict labor is prohibited.

Transportation and Commerce. Communication is almost exclusively by railroads, as none of the rivers is navigated to a considerable extent. A number of trunk lines extend across the State, including the Chicago, Rock Island and Pacific, the Atchison, Topeka and Santa Fé, the Missouri, Kansas and Texas, the Saint Louis and San Francisco, and a number of others. All the lines have numerous branches, hence all parts of the State are favored in having transportation facilities. The lines aggregate a total of 6,500 miles. Oklahoma, Guthrie, Muskogee, Ardmore, Enid, and McAlester are railway centers. The exports consist chiefly of grain, live stock, fruits, cotton, lumber, and coal. Manufactured goods, clothing, and machinery are imported. Telephone lines are operated in all parts of the State. Electric railways are maintained in the cities and more densely populated districts.

Education. The rate of illiteracy, based on

the entire population, is given at 5.5 per cent., but it is much smaller among whites and considerably greater among the Indians and Negroes. Public schools are maintained in all sections of the State where settlements have developed. The schools are supported in part from a public fund created by reserving two sections of land in each township, which is sold or leased according to the local demand, but additional support is obtained from county and local taxes. A superintendent of public instruction has general charge of the educational work, but he is aided through county and city superintendents. Attendance upon the schools is free and is compulsory between the ages of five and eighteen years. High schools are maintained in all the towns and cities, but the schools for colored children are separate. Norman is the seat of the University of Oklahoma; Alva and Edmond, of normal schools; Langston, of the Langston University; Stillwater, of the State Agricultural and Mechanical College; Weatherford, of the Northwestern Normal School; Tonkawa, of the University Preparatory School; and Oklahoma City, of Epworth University. Formerly Indian Territory and Oklahoma Territory had separate schools, but they are now merged into one system, although Federal support is still given to further the education of Indian children. Provisions have been made for the care of the deaf, dumb, insane, and other unfortunates. The State is rapidly solving the problem of placing the correctional and reformatory institutions on a modern and efficient basis.



Map to show the former territory of Oklahoma and Indian Territory.

Inhabitants. The population of Oklahoma is made up largely of immigrants from other states and Indians who resided in reservations before the State was admitted. In 1900 Oklahoma had 398,331 inhabitants, of which 11,945 were Indians and 18,831 Negroes. In the same year Indian Territory had a population of 391,960, which included 36,053 Negroes, and 52,500 Indians. Most of the Indians are classed with the Five Civilized Nations, including the Cherokee, Chickasaw, Choctaw, Creek, and Seminole races. Other Indians represented by considerable numbers include the Modoc, Osage, Ottawa, Seneca, Shawnee, and Wyandotte. The population of Oklahoma has been increasing rapidly, mainly through the immigration of whites, who have been attracted by the splendid resources of the State. In 1920 the total population, as ascertained by the federal census, was 2,027,564. Oklahoma City, in the central part, is the capital. Other cities include Guthrie, Ardmore, Muskogee, Lawton, Enid, Shawnee, South McAlester, El Reno, Chickasha, and Tulsa.

History. It is thought that the first white man to visit the region included in Oklahoma was Don Diego de Penalosa, who, in 1662, made a tour from the Gulf of Mexico to the regions beyond the Arkansas River. Title to it was secured by the United States in the Louisiana Purchase of 1803. It was included with a large scope of country set apart for the Indians in 1834. The government purchased a strip of land lying between Texas and Kansas, generally known as No Man's Land, in 1889, and this was added to other lands now included in Oklahoma. What was organized as the Territory of Oklahoma, a tract of 39,030 square miles, was detached from Indian Territory in 1890. Subsequently the government purchased titles from the Indians and in 1893 opened for settlement several large tracts by proclamation. Immediately vast numbers of settlers came into the region for staking claims and forming settlements.

In 1906 Congress passed the Statehood bill, which united the Territory of Oklahoma and Indian Territory, and the new State was admitted by proclamation on Nov. 16, 1907. Since tribal relations had already ceased among the Indians under an arrangement made by the government, in 1906, the adoption of statehood did not violate the rights or regulations previously granted to the Indians. The prohibition of the sale and manufacture of liquor was incorporated in the constitution by a large majority at the time of admission. Women are permitted to vote in school elections, but not in other elections. Having extensive natural resources and a favorable climate, Oklahoma is destined to become one of the wealthiest communities in the Union.

OKLAHOMA CITY, the capital city of Oklahoma, county seat of Oklahoma County, on the North Fork of the Canadian River, thirty miles south of Guthrie. It is on the Missouri, Kansas and Texas, the Saint Louis and San Francisco, the Chicago, Rock Island and Pacific, the Atchison, Topeka and Santa Fé, and other railroads. The noteworthy buildings include the county courthouse, the Carnegie public library, the Oklahoma City University, the high school, the city hall, and many schools and churches. It has electric street railways, public waterworks, sanitary sewerage, and pavements of brick and asphalt. The jobbing and wholesaling interests are very extensive. Among the manufactures are machinery, utensils, textiles,

and tobacco products. It has a growing trade in agricultural produce, lumber, live stock, and merchandise. Oklahoma City was founded in 1889 and within a month had 800 houses. It was incorporated in 1891. In 1900 it had 10,037 inhabitants. Population, 1907, 32,452; 1920, 91,258.

OKLAHOMA, University of, a coeducational institution at Norman, Okla., established in 1892. It is supported by State appropriations, a State income tax, and an income from the sale of certain public lands. All residents of the State are admitted with a nominal payment of tuition. The university maintains courses in the arts, sciences, pharmacy, medicine, engineering, education, law, fine arts, commerce, and preparatory work. The faculty includes about 240 instructors, the library contains 75,000 volumes, and the attendance is 4,200 students.

OLAF (ō'läf), **Saint,** King of Norway, born in 995; slain in battle July 29, 1030. He descended from Harald Haarfager, being the son of Harald, chief of the district of Granland, and was an ally of the Normans. In 1015 he deposed Eric and Sevend Jarl from the throne of Norway, and as the sovereign of that country became noted as an advocate of Christianity. His zealous persecution directed against the pagans caused many of his subjects to form an alliance with Canute the Great, King of Denmark, who landed in Norway in 1028. Olaf was compelled to flee to Russia and in an attempt to recover the country, two years later, was slain in battle at Stiklestad. He was proclaimed the patron saint of Norway in 1164 and was made the hero of many popular sagas and mythical legends. In 1848 the Order of Saint Olaf was founded in Norway. The honors of this order are bestowed by the king on those who render valuable services to arts and sciences and to the country.

ÖLAND (ē-länd'), or **Oeland,** an island in the Baltic Sea, located off the coast of Sweden, to which it belongs. It has an area of 510 square miles. For political purposes it is included with the county of Kalmar. The soil is not naturally fertile, but it has been improved by cultivation and the use of fertilizer. Barley, oats, flax, and cattle are the chief products. Productive fisheries are located off the coast. Borgholm, the capital and chief town, contains an old castle. Population, 1922, 31,216.

OLBERS (ôl'bĕrs), **Heinrich Wilhelm Mathäus,** physician and astronomer, born at Arbergen, Germany, Oct. 11, 1758; died in Bremen, March 2, 1840. He studied medicine at Göttingen and became a practicing physician at Bremen, but devoted much time to the study of astronomy. His reputation for astronomical research became general in Europe, in 1779, when he calculated the orbit of a comet that appeared that year. In 1802 he discovered the planet Pallas and in 1807 the planet Vesta. The comet named Olbers' comet was discovered by him in 1815, and he also discovered four others of minor importance. He is the inventor of a method of calculating the velocity of falling stars and discovered several interesting matters in relation to the origin of meteoric stones.

OLDCASTLE (ōld'kăs'l), **Sir John,** nobleman and martyr, born in England in 1360; suffered martyrdom Dec. 14, 1417. He acquired nobility by marrying Johanna, an heiress of the noble family of Cobham, and was known as Lord Cobham. Henry IV. was his personal friend. He attained to a reputation as a soldier and statesman, serving in the House of Lords. In 1411 he accompanied the English auxiliaries sent to assist the Duke of Burgundy in raising the siege of Paris laid by the Duke of Orleans. Oldcastle gave material assistance to the reformatory work carried on by Wycliffe and during the life of Henry IV. he was sheltered by imperial protection, but Henry V. supported in a large measure the persecutions of the bishops. Later he was excommunicated and examined, when he made a confession of his religious opinion and was accordingly imprisoned in the Tower. However, he soon made his escape to Wales, where he eluded his opponents for several years. In 1417 he was seized and brought to London and, being unwilling to recant, was burned at the stake. His writings include "Twelve Conclusions Addressed to the Parliament of England."

OLDENBURG (ōl'dẹn-bûrg), the name of a city and a grand duchy of Germany. The grand duchy of Oldenburg is composed of the principalities of Lübeck and Birkenfeld and the duchy of Oldenburg. The total area is 2,479 square miles. A large part of the drainage is by the Weser into the North Sea. It is celebrated for its fertility of soil and its intimate connections with the history of Germany. In ancient times it was occupied by Teutonic peoples who were later known as Frisans, and it was noted as a Protestant stronghold during the Reformation. The history properly begins with the 12th century, when a count of the House of Oldenburg became the ruler. In the 17th century it became a possession of Denmark, but was made a duchy in 1777. Since 1871 it has belonged to Germany. Population, 1922, 482,430.

The city of Oldenburg is on the Hunte-Ems Canal, 25 miles west of Bremen, and is the capital of the duchy of Oldenburg. It has a public library of 100,000 volumes, a museum of natural history, the Church of Saint Lambert, and a fine railroad station. The palace is surrounded by beautiful gardens and contains many works of art. Among the manufactures are leather, clothing, glass, machinery, and earthenware. Population, 1905, 28,565; in 1920, 30,108.

OLD FORGE, a borough of Pennsylvania, in Lackawanna County, on the Lackawanna River, four miles southwest of Scranton. It is on the Delaware, Lackawanna and Western Railroad and is surrounded by a productive anthracite coal-mining region. Old Forge has one of the finest high school buildings in the county.

Waterworks, sewerage, and electric lighting are among the public facilities. The manufactures include glass, fertilizers, chemicals, silk and cotton textiles, and machinery. The first settlement in its vicinity was made in 1830, but it was not incorporated until 1899. Population, 1900, 5,630; in 1920, 12,237.

OLDHAM (ōld'ḥạm), a city of northwestern England, in Lancashire, on the Medloch River, 37 miles northeast of Liverpool. It is connected with other trade emporiums by a number of railroads and is noted for its extensive industries and commercial trade. The manufactures include cotton and woolen goods, leather, machinery, silk textiles, cordage, boilers, and engines. Linens were manufactured in Oldham as early as 1630, but its prosperity is due largely to the development of the extensive coal fields in the vicinity. Water mills were established here in 1770. It is at present one of the most important cotton-manufacturing centers of the world. The noteworthy buildings include the townhall, the parish church, and the commercial exchange. Alexander Park includes sixty acres. Among the general facilities are public baths, electric lights, street railways, and stone and macadam pavements. Population, 1921, 147,495.

OLD POINT COMFORT, a village in Virginia, at the south end of Chesapeake Bay, near the mouth of the James River, about fourteen miles north of Norfolk. Communication is by steamboats and by the New York and Philadelphia and the Chesapeake and Ohio railroads. Near it is Fortress Monroe. It is noted for its scenery and as a popular watering and bathing resort. The village has a number of excellent hotels and other facilities. In 1862 it was almost totally destroyed on account of its proximity to Fortress Monroe, but it was rebuilt soon after the war.

OLD RED SANDSTONE, the name of an important geological formation, belonging to the Devonian Age. It lies below the carboniferous strata and is so named to distinguish it from the New Red Sandstone (q. v.), which occurs above the coal measures. In some places the formation has an estimated thickness of 6,000 to 18,000 feet, including many shales and conglomerates. Many fossils of remarkable fish remains occur in it, hence geologists think that it was deposited in inland lakes or seas. Hugh Miller refers to this formation in his literary works entitled "The Old Red Sandstone" and "Footprints of the Creator."

OLD SOUTH CHURCH, a celebrated church erected in Boston, Mass., in 1730. It was built on a tract of land purchased by John Winthrop and is noted as the meeting place for the Americans during the Revolution. The British used it as a riding school during the siege of Boston, when the library gathered by the Rev. Thomas Prince was scattered. It is now used as a hall for lectures upon historical subjects and as a museum of relics relating to the early history of the colonies and the United States.

OLDTOWN, a city of Maine, in Penobscot County, on the Penobscot River, twelve miles northeast of Bangor. It is on the Bangor and Aroostook and the Maine Central railroads. The chief buildings include the high school, the public library, the city hospital, and the Odd Fellows' Block. It has waterworks, electric and gas lighting, and sanitary sewerage. Extensive water power is utilized in various manufactories, such as mills and machine shops. It has a large trade in lumber and lumber products. The place was settled in 1820 and incorporated in 1840. Population, 1900, 5,763; in 1920, 6,630.

OLEAN (ō-lē-ăn'), a city of New York, in Cattaraugus County, near the Allegheny River, seventy miles southeast of Buffalo. It is on the Erie, the Pennsylvania and other railroads. The surrounding country is agricultural and dairying and has deposits of mineral oil. Among the noteworthy buildings are the public library, the State armory, the General Hospital, and the high school. Waterworks and street railways are among the municipal facilities. The manufactures include ironware, leather, flour, refined oil, machinery, and farming implements. It has a growing trade in farm produce and merchandise. Olean was settled in 1804 and incorporated as a city in 1893. Population, 1905, 9,860; in 1925, 21,332.

OLEANDER (ō-lē-ăn'dẽr), a class of beautiful evergreen shrubs, known as *rose laurel* in France and as *rose bay* in England. It is

OLEANDER.

native to India, but is now naturalized in many temperate and warm countries, though it requires protection during the winter. The leaves are opposite and lance-shaped and when punctured exude a milky juice. The flowers grow in terminal clusters and are of a rose or white color. They have a beautiful appearance, though their odor is not particularly pleasant. The shrubs attain a height of from eight to ten

feet, growing mostly in moist places, and the leaves and roots yield medical and poisonous properties. Several species are grown as house plants. They are easily propagated by cuttings and are kept indoors during the winter.

OLEASTER (ō-lē-ăs'tēr), the name of a small tree native to the warm regions of the Eastern Hemisphere. It is planted as an ornamental tree for its silver foliage. Several species have been described. It grows to a height of about twenty feet, has exceedingly fragrant flowers, and blooms about the middle of May. A species known as *goumi* is grown in Japan for its acid berries.

OLE BULL. See **Bull, Ole.**

OLEIC ACID (ō'lē-ĭk), a colorless liquid obtained by treating olive oil and animal oils with potash. It is without smell or taste, unless it is exposed to air, and solidifies to a firm mass at low temperature. Oleic acid is a component of olein, which is the glyceride of oleic acid, and is the predominating constituent of olive oil and other liquid fats. It is used in the manufacture of soaps, forming *hard soap* with soda and *soft soap* with potash.

OLEOMARGARINE (ō-lē-ō-mär'gà-rĭn), an artificial butter originally made of pure beef fat, sometimes called *margarine* and *butterine.* It is now manufactured from milk, cream, neutral lard, vegetable oil, and pure butter and, after these ingredients are thoroughly worked together, a coloring matter is added. The manufacture of butter from animal fat was first suggested in France by a chemist named M. Hippolyte Mège, where the process was patented, and it was subsequently introduced into the United States and other countries. However, the process varies to some extent, this depending upon the particular product desired, and machinery of considerable complexity is involved in the operation. The ingredients named above are those usually employed, the neutral lard being prepared from the leaf lard of the hog, and oleo oil is made from the selected fat of the steer. These fats are the very best obtainable and, after the animal heat is removed, they are washed carefully and freed of the tissue and fibrin. They are next reduced to a liquid form by heating, when cream and milk are added and the whole mass is churned. The product depends upon the flavor and grade of oleomargarine desired. Usually a considerable per cent. of the finest quality of butter is added, and the whole is colored to resemble the dairy product.

Another process consists of preparing the purest fresh beef suet, which is the fatty tissue found in the region of the loins and kidneys of cattle and sheep, by cleansing it in lukewarm water and cutting it as fine as possible by machinery. The membranes of the fat cells are separated from the fat by heating the suet in large vats of water by means of steam to about 130° Fahr. Usually the entire bulk is allowed to rest about two hours while kept warm, in which time the particles of membrane settle and the fat floats as an oil. The oil is now drawn off and allowed to solidify, after which it is subjected to pressure. In this form it is known as *expressed oleomargarine.* A quantity of milk and butter is now added and the whole is churned until the ingredients are mixed thoroughly. The product is then worked and packed the same as pure butter made from cream, and put up in convenient packages. A national law requires that every package be carefully marked, so that consumers may be able to determine the oleomargarine from dairy butter. The manufacture of this product is now an important industry. Chemists have demonstrated its nutritive value to be practically identical with the dairy product. See **Butter.**

OLGA, Saint, a saint of the Greek Church, the wife of Prince Igor of Kiev. Her husband conducted an unsuccessful expedition against Constantinople and was slain. In 952 she embraced Christianity, having previously assumed the government as regent for her minor son. After returning to Russia, she pursued with much diligence the work of introducing Christianity. She died in 969. Her festival dates from an early period. It occurs on July 11.

OLIGOCENE PERIOD (ŏl'ĭ-gō-sēn), a division of geological time, extending from the Eocene to the Miocene. The term was first employed by Sir Charles Lyell, but is not used extensively in Canada and the United States. See **Geology.**

OLIPHANT (ŏl'ĭ-fant), **Laurence,** traveler and novelist, born in England in 1829; died there Dec. 23, 1888. He was the son of Sir Anthony Oliphant, chief justice of Ceylon, and studied law at the University of Edinburgh, but did not practice after being called to the bar. He visited Russia in 1852 and soon after came to Canada as private secretary to the Earl of Elgin, then Governor General, and later accompanied him on his embassy to China. In 1861 an assassin inflicted a dangerous wound upon him while in Japan. Soon after he resigned and returned to England, where he engaged as correspondent to several periodicals and was for some years a member of Parliament. Later he joined T. L. Harris in attempting to found a socialistic community in Portland, N. Y., and, after this enterprise failed, he settled at Haifa, near Mount Carmel, in Palestine. His writings include many excellent productions, such as "The Russian Shores of the Black Sea," "Minnesota and the Far West," "Piccadilly," "Episodes in a Life of Adventure," "Land of Gilead," "Transcaucasian," "Campaign under Omar Pasha," and "Land of Khemi." He published a work on spiritualism entitled "Scientific Religion."

OLIPHANT, Margaret, novelist and biographer, born near Musselburgh, Scotland, April 4, 1828; died June 25, 1897. Her maiden name

was Wilson and she married her cousin, Francis Oliphant, who was a relative of Laurence Oliphant. After securing an education, she engaged in literary study, her first publication appearing in 1849 under the title of "Passages in the Life of Mrs. Margaret Maitland," being a work of fiction in which the life and character common to Scotland are delightfully delineated. This work attracted general attention and she soon won fame as a contributor to *Blackwood's Magazine* and the publication of other novels. A pension of $500 was granted to her in 1868 and she was otherwise honored by recognition extended to her by a number of societies. Her writings embrace about thirty novels, fifteen other works, and many contributions to periodicals. The best known works include "Adam Graeme of Mossgray," "Katie Stuart," "Salem Chapel," "Chronicles of Carlingford," "The Marriage of Elinor," "Life of Laurence Oliphant," "Joan of Arc," "Heir Presumptive and Heir Apparent," "He That Will Not When He May," "Life of Edward Irving," "The Makers of Florence," "Literary History of England from 1790 to 1825," "Victorian Age of English Literature," and "Royal Edinburgh."

OLIVE (ŏl'ĭv), a genus of evergreen trees and shrubs found in the warmer regions of the temperate climates. They attain to a height of

OLIVE.

A, Cluster of flowers; *B*, Single flower; *C*, Fruit.

from fifteen to thirty feet. The leaves are lanceolate or oblong, have a smooth surface above and are horny beneath, and are bluish or dusky-green in color. The flowers are small and whitish, growing in racemes or clusters, which are terminal. Several species of olives are cultivated, most of which are native to Syria, but they have been acclimated extensively in Asia, Europe, Australia, and North America, particularly in the states south of North Carolina and on the Pacific coast. The olive tree bears a fruit of oblong-spheroidal form, with a thin, smooth skin and a hard stone. In all species the fruit is more or less bitter and is used extensively as a condiment, although it is cultivated principally for the sake of its oil.

The olive tree grows slowly, but is hardy and long-lived. It yields a wood which is prized in cabinet work. Specimens of olive trees are found in Turkey and other countries on the Mediterranean which are estimated to be fully 1,300 years old, while some in Italy are thought to have existed since the time of Pliny. The olive tree was held sacred to Minerva by the ancients. Many peoples of historical times gave it particular esteem. Wreaths of olives were placed on the brows of victors by the Greeks and Romans. Twigs and leaves of this tree are still regarded as emblems of peace by many peoples, who use the olive branch as a symbol. The olive tree is propagated by slips, seeds, or grafting. It was introduced into the southeastern part of the United States more than 200 years ago. Plantations of olive trees are abundant in California, Turkey, Spain, France, Italy, Malta, Greece, and the Ionian Islands. Several species are cultivated in Japan and China, where the leaves are used for adulterating tea and the flowers serve to give a pleasant flavor to that drink.

Olives intended for table use are picked in an unripe condition. A portion of the bitterness is removed by soaking them in water containing potash, after which they are bottled in an aromatized brine. *Olive oil* is a non-drying oil and is extracted from the fruit by pressure. The olives are gathered and immediately placed in a crushing mill, where they are ground into pulp. Usually the pulp is placed in a press operated by a screw and the oil oozes from it into a barrel containing water, where it is separated from impurities by the particles settling to the bottom, the oil remaining on the top. The product secured from the first pressure is the best grade of *virgin olive oil,* but the pulp is pressed a second time and sometimes a third and fourth times. The last product is an inferior quality and is used for soap making, while the pulp serves for fuel. Olive oil is clarified by filtration through sand and charcoal, when it assumes a beautiful golden color. An oil made from peanuts somewhat resembles olive oil and is often sold on the market as a substitute.

OLIVE OIL. See **Olive.**

OLIVES, Mount of, or **Mount Olivet,** an eminence situated east of Jerusalem, separated from the city by the Jehoshaphat valley. It was so named from groups of olive trees that formerly grew here, but most of them have been destroyed. The center is somewhat rounded, is

2,640 feet above sea level and about 385 feet above the valley. A brook called the Kedron flows through the valley, near which stream was the garden of Gethsemane. The village of Olivet, or Tur, occupies the central part of the hill. On the principal summit is a beautiful Armenian church, which is said to mark the spot whence the Ascension occurred, though according to the gospel of Luke that event took place on the farther side of the hill from Jerusalem, near Bethany. Near the church tourists are shown what is thought to be the place where the Savior wept over Jerusalem and where He taught the Lord's Prayer to His disciples. The road leading to Jerusalem around the eastern and southern sides of the Mount of Olives is said to be the one on which He made His triumphant entry into the city.

OLLA-PODRIDA (ŏl'lå pō-drē'då), the name of a favorite dish of the Spaniards, consisting of a stew made of meat and vegetables. The ingredients are cut into small pieces and boiled in water, after which milk and seasoning are added. The term is applied figuratively to any miscellaneous collection, particularly to productions in literature.

OLLIVIER (ō-lē-vyā'), **Emile,** statesman and author, born in Marseilles, France, July 2, 1825. He studied law in Paris, where he entered upon a successful practice, and in 1848 was a leading participant in the Revolution. In 1864 he became a member of the legislative assembly, where he supported the liberals, and in 1865 engaged as a judicial officer to the viceroy of Egypt. Napoleon III. invited him to form a ministry in January, 1870, and it was this ministry that declared war against Germany in July, 1870. Soon after the first reverses of the French army he was displaced. His writings are principally political and historical in character and include biographies of Thiers and Lamartine. He died Aug. 20, 1913.

OLMSTED (ōm'stĕd), **Frederick Law,** landscape gardener, born in Hartford, Conn., April 26, 1822; died in 1903. He pursued studies relative to agriculture at Yale University, where he also took a course in engineering, and in 1848 began to develop skill as a landscape gardener. In 1850 he traveled on foot in England. He visited France, Germany, and Italy in 1855 to study ornamental gardening and parks. Later he had charge of platting Central Park, in New York City. Subsequently he platted the Capitol grounds at Washington, the grounds of the Columbian Exposition at Chicago, in 1893, and a number of parks of large cities, including Buffalo, Chicago, and Brooklyn. From 1863 until 1865 he served as a member of the California Yosemite Restoration Committee. In the meantime he filled an appointment under President Lincoln as sanitary commissioner in connection with the Civil War. He wrote "Walks and Talks of an American Farmer in London," "Journey Through Texas," "Journey in the Slave States," and "Journey in the Black Country."

OLMÜTZ (ŏl'müts), a city of Czecho-Slavakia, in the province of Moravia, on the March River, forty miles northeast of Brünn. It has communication by railroads and electric railways. Formerly it was strongly fortified, but the works have been converted into parks and promenades. Among the principal buildings are the Church of Saint Mauritius, the Jesuit monastery, the commercial exchange, the *Realschule,* the industrial museum, and the public library of 80,000 volumes. It has manufactures of flour, chemicals, clothing, and spirituous liquors. The place is mentioned as early as 1863, when it had a large castle, and became the seat of a bishopric in 1063. Ferdinand I. abdicated here in 1848. Population, 1922, 23,836.

OLNEY (ŏl'nĭ), **Richard,** statesman, born in Oxford, Mass., Sept. 15, 1835; died April 8, 1917. He graduated at Brown University in 1856, studied three years at the Harvard Law School, and, after being admitted to the bar, developed a successful practice in Boston. In 1874 he entered the Massachusetts Legislature, but soon after retired from public life to attend his extensive law practice. President Cleveland appointed him Attorney-General in 1893. Two years later he became Secretary of State as successor to Gresham, the duties of which office he administered with much ability. Subsequently he resumed the practice of law.

RICHARD OLNEY.

OLYMPIA (ō-lĭm'pĭ-a), capital of the State of Washington, county seat of Thurston County, at the southern extremity of Puget Sound, about 100 miles north of Portland, Ore. It is on motor routes, the Northern Pacific, and the Union Pacific railroads. An abundance of water power is obtained from the Deschutes River, which has a succession of falls that descend 85 feet. A bridge 2,300 feet long spans the southern part of the sound. Among the noteworthy buildings are the State capitol, the county courthouse, the high school, the Saint Peter's Hospital, the Temple of Justice, and the Capital National Bank building. The manufactures include lumber products, hosiery, underwear, and canned fruits. It is surrounded by a fertile country, which produces cereals, grasses, fruits, and lumber. Waterworks, gas and electric lighting, and sanitary sewerage are among the utilities. In 1846 the first settlement in Washington was made near Olympia. The place was chartered as a city in 1859. Population, 1900, 3,863; in 1920, 8,537.

OLYMPIA, a valley of Greece, in the southeastern part of Elis, on the banks of the Alpheus River. It is noted as the scene of the Olympic games. In the Altis, or sacred grove, said to have been inclosed by Hercules, was the temple of Zeus, which contained his celebrated statue by Phidias. The vicinity contained many statues of gods and victors in the games, especially in the time of Pliny the Elder, about the year 50 A. D., but the space is now occupied with gardens and fields. Extensive excavations were made in the vicinity by the government of Germany, which resulted in finding coins, medals, and many sculptures, including that of Hermes by Praxiteles.

OLYMPIAD, the period of four years between any two successive celebrations of the Olympic games, used by the ancient Greeks in computing time. It was their custom to designate the Olympiads by numbers, beginning with 776 B. C., when Coroebus won a famous foot race. It was customary to state that an occurrence took place in a year of a certain Olympiad, or that it happened in a particular Olympiad. The last Olympiad, which was the 293d, occurred in the year 394 of the Christian era.

OLYMPIC GAMES, the national festivals of the ancient Greeks, celebrated on the plain of Olympia once in four years. They were given in honor of Zeus and constituted their most noted national institution. Olympia, the scene of these games, was a locality in the beautiful valley of the ancient district of Elis, in the Peloponnesus, through which flows the Alpheus River. It was adorned by many exquisite works of art, including statues of the gods and celebrated victors, and many monuments, temples, tombs, altars, and treasures of art. It had fully 3,000 statues in the time of the elder Pliny. Among other improvements were the temple of Zeus, known as the Olympium; the temple of Hera, the wife of Zeus; the ten treasuries, in which were stored the dedicatory offerings of the Greek cities; and the Hippodrome and the Stadium, where the contests occurred. The valley was finely improved by highways, groves, and gardens. Recent excavations have thrown much light upon this locality by the discovery of sculptures and the remains of buildings.

The Olympic games date from 776 B. C., but they were discontinued in 396 A. D. by Emperor Theodosius. Time was reckoned by the Greeks from the year in which the Olympic games were instituted as a national festival, naming the periods of four years between the celebrations as *Olympiads.* The contests took place originally only between Greeks, but after the Roman conquest the competition became general. Among those victorious at the games were Tiberius, Nero, and other distinguished personages. Processions indicating the beginning of the games passed along the Pompic Way, a road that crossed a beautiful spot 660 by 580 feet in extent, which contained the sacred grove of Altis and sanctuaries of great beauty and value. Hostilities between contending parties ceased while the games were in progress. Every Greek who had left his native country made it a point to return on these occasions, if possible, in order to contend in the various athletic sports. These sports consisted of running, wrestling, and other exercises calling into account the various muscles of the body, the favorite games being chariot and horse racing, throwing the quoits and spears, and leaping.

It was necessary for all who took part in these games to have at least ten months' training in the Elis Gymnasium. Judges were selected to determine who should receive the prizes. Those receiving the highest stations of honor were adorned with wreaths of palm leaves and in later years with garlands taken from the olive trees in the sacred grove. Many of the distinguished victors had statues erected to their memory, and they were otherwise honored by favorable mention and by exemption from taxation. During the festivals many sacrifices and services of devotion were offered to the gods.

A movement originated in modern Greece in 1896 to revive the Olympic games, that year being exactly 1,500 years after they were abolished by Emperor Theodosius. At that time a fine stadium was erected and the performances were witnessed by distinguished people from all countries. The sports consisted of aquatic and athletic performances. Many Greeks, as a result of this movement, have acquired a new impetus for the development of athletic skill, exercises calculated to benefit the nation as a whole. Subsequently these games developed into international sports. Contests for the world's championship were held at Paris, France, in 1900; in Saint Louis, Mo., in 1904; in Athens, Greece, in 1906; in London, England, in 1908; in Stockholm, Sweden, in 1912. The games were held at Brussels, Belgium, in 1920, and at Paris, France, in 1924.

OLYMPUS (ō-lĭm'pŭs), **Mount,** a range of mountains in Turkey, on the boundary between Macedonia and Thessaly. The highest peak rises 9,740 feet above sea level. In the region are many deep ravines and precipices in which forest trees are abundant. This group of mountains entered largely into the mythology of the ancient Greeks, since they believed that Zeus occupied a palace on the top of Mount Olympus. They regarded its peak wrapped so densely in clouds and mist that it was hidden from mortal view. Their poetry relates that its atmosphere is bright and refreshing and that youth never ages there. On its summit was the palace of Zeus and Hera, a structure of burnished gold, cast silver, and gleaming ivory. The later legends, originating at a time when the knowledge of the universe and divine powers became enlarged, convey the view that the gods have their existence in the heavens, among

the planets, and it was thus that the name of Olympus became attached to the firmament.

OLYPHANT (ŏl'ĭ-fant), a borough of Pennsylvania, in Lackawanna County, on the Lackawanna River, five miles northeast of Scranton. It is on the Delaware and Hudson and the New York, Ontario and Western railroads, and is noted as a mining and shipping center of anthracite coal. The improvements include electric lighting, street paving, and sewerage. Among the manufactures are blasting powder, cigars, and machinery. The first settlement on its site was made in 1857, but its growth dates from the opening of the extensive coal fields in its vicinity. Population, 1920, 10,236.

OMAHA (ō'mȧ-hȧ), the largest city in Nebraska, county seat of Douglas County, on the Missouri River, opposite Council Bluffs, Iowa. It is on the trunk lines and the terminus of many railways, including the Union Pacific, the Wabash, the Burlington, the Chicago Great Western, the Illinois Central, the Missouri Pacific, the Chicago, Rock Island and Pacific, the Chicago and Northwestern, the Chicago, Milwaukee and Saint Paul, and a number of others. The Missouri River is crossed by several bridges, including the famous structure that connects the railway lines on both sides. An extensive system of electric railways furnishes transportation to all parts of the city and has branches to Council Bluffs, South Omaha, and other points in the two states.

Omaha occupies a fine site on the west side of the Missouri River, consisting chiefly of a gently rolling plot and including an area of about 50 square miles. The streets are broad and regularly platted, and about 375 miles are substantially paved with cement, brick, or asphalt. About 3,600 acres are included in the public parks, of which Riverview, Hanscom, Elmwood, and Miller parks are the most noted. The architecture is modern and substantial, including the county courthouse, the postoffice, the Woodmen's building, the Brandies Theatre, the Medical Arts building, and the Fontenelle Hotel. It has five fine high schools and two cathedrals, those of the Protestant Episcopal and the Roman Catholic churches. In the public library are 95,000 volumes. The institutions of higher learning include the medical college of the University of Nebraska, the University of Omaha, the Creighton University (Roman Catholic), the Brownell Hall, and the Creighton Medical College. It is the seat of the State school for the deaf and has many private schools and hospitals. All the leading religious denominations have fine church edifices.

Omaha has large shops of the Union Pacific Railway. It is the seat of extensive establishments for smelting and refining the ores of lead, copper, gold, silver, and other metals, which are transported to the city from points in Wyoming and Colorado. South Omaha, a short distance south, has large slaughtering and meat-packing establishments, which, in the amount of stock slaughtered ranks among the largest slaughtering centers. Having extensive communication by railways, Omaha is important as a wholesaling and jobbing center of groceries and dry goods. It contains large lumber yards and grain elevators and has manufactures of brick and tile, machinery, clothing, flour, butter, bread, hosiery and cured and packed meat. The systems of waterworks, telephones, sewerage, and gas and electric lighting are well managed.

The site of Omaha was visited by Lewis and Clark in 1804. Fur traders built a stockade and trading station in the vicinity in 1825. The first permanent settlement was established in 1854, when it became the capital of Nebraska, and it remained the seat of government until 1867. It was incorporated as a city in 1857, but its growth dates from 1864, when work was commenced on the Union Pacific Railway. In 1898 it was the seat of the Trans-Mississippi and International Exposition. South Omaha was annexed in 1915. Population, 1900, 102,555; in 1920, 191,601.

OMAHAS, an Indian tribe of the Dakota family, which was first met in 1673 by Father Marquette. The Omahas formerly occupied the region now included in eastern Nebraska and western Iowa. In 1820 they ceded their lands at Council Bluffs. Several wars occurred between them and the Sioux Indians, but in 1854 a general peace was declared. Their reservation is situated in the northeastern part of Nebraska, where they have made material advancement in the arts of peace, especially in agriculture. They patronize schools and churches and engage extensively in the culture of cereals, live stock, and vegetables.

OMAN (ō-män'), a political division of Arabia, in the southeastern part of the Arabian Peninsula. It extends along the Persian Gulf, the Gulf of Oman, and the Arabian Sea, including a coast line of about 1,500 miles. The area is 81,500 square miles. It is divided into a number of districts or states, of which Muscat is the most important. The surface, though fertile in many places, includes large stretches of rocky and sandy deserts. Along the coast is a highland with numerous mountains, some of which rise 10,000 feet above the sea. Beyond the mountains is a region of grazing lands, but these gradually merge into the great deserts of Arabia. Dates, cotton, sugar, coffee, rice, and camels are the chief products. Pearls and mother-of-pearl are exported. The imports consist chiefly of ammunition, silk textiles, and foodstuffs.

A large part of the region became a possession of Portugal in 1508, but it fell into the hands of the Arabs in the 17th century. Later the imams, or sultans, of Muscat annexed a narrow tract along the eastern coast of Africa. At present the country is nominally under the protection of Great Britain. Muscat is the capital

and principal seaport. The inhabitants consist chiefly of Mussulmans of Arab origin. In habits of life they are partly nomadic. They are Mohammedan in religion. Population, about 1,500,000.

OMAR I. (ō'mēr), second caliph of the Moslems after Mohammed, born in 582; died in 644. He became a convert to Mohammedanism in 615 and succeeded Abu-Bekr in 634. During his caliphate a remarkable increase was made in the numerical strength of the Moslems. The armies sent forth by him conquered Syria in 636, Jerusalem in 637, and Egypt in 640. Later he subdued Persia and carried his dominion far south of the Mediterranean Sea. A mortal wound inflicted upon him by a Persian slave at Medina, in 644, ended his victorious career. The calculation of time from the Hegira was instituted by him. A Mohammedan historian says the following of him: "He took from the infidels 36,000 cities or castles, destroyed 4,000 temples or churches, and founded or endowed 1,400 mosques." Othman succeeded him as caliph.

OMAR KHAYYÁM (khī-yäm'), astronomer, poet, and mathematician, born in Nishapur, Persia, about the middle of the 11th century; died there in 1123 A. D. He studied under one of the eminent Persian teachers, and soon after engaged extensively in the study of astronomy and mathematics. A government pension enabled him to devote his time to research, and during that period he effected a reconstruction of the calendar. He is the author of a treatise on astronomy and several treatises on mathematics, and published a number of excellent poems and epigrams. Several of his writings have been translated into European languages, among them a work on algebra into French and a poetical work known as "Rubáiyát" into English and German. His writings indicate that he was a free thinker, though as a matter of policy he made a pilgrimage to Mecca.

OMAR PASHA (pä-shä'), Turkish general, born in Plaski, Austria, in 1806; died in Constantinople, April 18, 1871. He was the son of an Austrian officer who was stationed in the province of Croatia and his proper name was Mikail Lattas, but on account of committing a slight offense he fled to Turkey, where he changed his name to Omar and embraced the Moslem faith. His natural ability and education brought him in contact with high officials of the government, and he soon became tutor to the heir apparent to the Turkish throne, Abdul Medjid. After the latter became Sultan, Omar Pasha was appointed governor of Lebanon, and in 1843 became commander of the army in Bosnia and Albania. From 1853 until 1856 he commanded the Turkish forces against the Russians, within which time he defeated them at Kalafat and Eupatoria. Later he was made governor of Bagdad, put down a rebellion of Montenegrins in 1862, and served as minister of war at Bagdad until 1869. Subsequently he held the honorary position of advisory minister until his death.

OMEN (ō'mĕn), a sign or presage that is supposed to indicate a future event. The ancient Romans supposed that the gods indicate their favor or displeasure by some sign or token. They considered it necessary to observe omens. This was done under the direction of magistrates, who were assisted by the *haruspices* and *augurs*. Belief in omens fell into disrepute among the intelligent classes in the time of Cicero.

OMNIBUS (ŏm'nĭ-bŭs). See **Carriage.**

OMNIBUS BILL, a term frequently applied to legislative acts, especially those in which several measures are more or less closely related. In the United States it was first applied to a bill submitted to Congress by Henry Clay in 1850. This bill provided for the admission of California as a free State, the erection of territorial governments in New Mexico and Utah without reference to slavery, the establishment of a boundary line between New Mexico and Texas, the abolition of the slave trade in the District of Columbia, the more effective enforcement of the fugitive slave law, and the payment of $10,000,000 to Texas for her claim to a part of New Mexico. This bill is incorrectly called a compromise, or omnibus bill, since the different matters referred to were later covered by separate bills.

OMSK (ômsk), a city of Asiatic Russia, capital of the government of Akmolinsk, in the western part of Siberia. It is at the junction of the Om and Irtysh rivers, on the Trans-Siberian Railway, and is surrounded by a barren steppe. The architecture is inferior, but the city has a technical school, two gymnasiums, and a normal school for teachers. As a military station it is important and it has considerable inland trade. Population, 1922, 54,150.

ONEGA (ō-nē'gà), a river of northern Russia. It rises in Lake Latcha, in the government of Olonetz, and after a course of 275 miles toward the north flows into Onega Bay, an inlet from the White Sea. It is navigable for a distance of 80 miles.

ONEGA, a large lake of northern Russia, in the government of Olonetz, located northeast of Lake Ladoga, next to which it is the largest lake in Europe. It is 146 miles long and 52 miles wide. The area is 3,760 square miles. Several rivers flow into it. Its outlet is the Svir River, which flows into Lake Ladoga. It has a depth of about 600 feet, is rich in fish, and contains a number of islands. Lake Onega is connected by canal with the Volga system of Caspian Sea navigation and with the White Sea by the Dwina canal system.

ONEIDA (ō-nī'dà), a city of New York, in Madison County, in a fertile farming region, 26 miles east of Syracuse. It is on the West Shore, the New York, Ontario and Western, and the New York Central railroads. Allen and

Higenbotham parks are fine public resorts. The chief buildings include the public library, the high school, the city hospital, and several churches. Among the manufactures are flour, steam engines, cotton and woolen goods, and machinery. Waterworks, sanitary sewerage, and electric street railways are among the public utilities. The Oneida Community is about two miles south. Oneida was settled in 1834 and incorporated in 1848. Population, 1925, 10,656.

ONEIDA, a lake in northeastern New York, in Oneida, Oswego, Onondaga, and Madison counties, about twenty miles southeast of Lake Ontario. The length is twenty miles and the width is from two to seven miles. It discharges through the Oneida and Oswego rivers into Lake Ontario. The lake and tributary streams abound in fish.

ONEONTA (ō-nē-ŏn'tȧ), a city of New York, in Otsego County, on the Susquehanna River, sixty miles northeast of Binghamton. It is on the Ulster and Delaware and the Delaware and Hudson railroads and is surrounded by a farming and stock-raising country. The noteworthy buildings include the public library, the Oneonta State Normal School, the State armory, and the Amelia Fox Memorial Hospital. Among the manufactures are shirts, flour, storage batteries, automobile bodies, machinery, and cigars. It has modern municipal facilities, including pavements, waterworks, and sanitary sewerage. The place was settled in 1800 and incorporated in 1848. Population, 1905, 8,054; in 1925, 12,057.

ONION, an edible bulb, produced by a biennial herb of the lily family. The plant has tubulated leaves and a pithy stalk bearing the seed. The root is a bulb with a strong odor and taste, due to an acrid volatile oil that is destroyed by boiling. Onions are native to Central Asia, but they have been cultivated from the tropics to regions far into high latitudes for centuries. They attain the largest size in warm countries. The cultivated plants include about twenty species, including the Strassburg, Egyptian, Spanish, Danvers, Portuguese, Bermuda, and Pearl. Onions have a stimulating influence on the secreting organs and are used in medicine. *Garlic* belongs to the same family, but has a stronger odor and taste, and its bulb is composed of from eight to twelve smaller ones, called *cloves.* Onions can be grown successively on the same ground from year to year, but they require much manuring. Some species bear bulbs at the top, but those generally grown for the markets yield large rooted bulbs.

ROOTED ONIONS. TOP ONIONS.

ONKELOS, an eminent Greek writer, who probably lived about 400 A. D. He is the translator of a version of the Pentateuch and wrote in the Aramaic language. The translation is literal, closely resembling the Hebrew text, and was used in many synagogues as late as the 16th century.

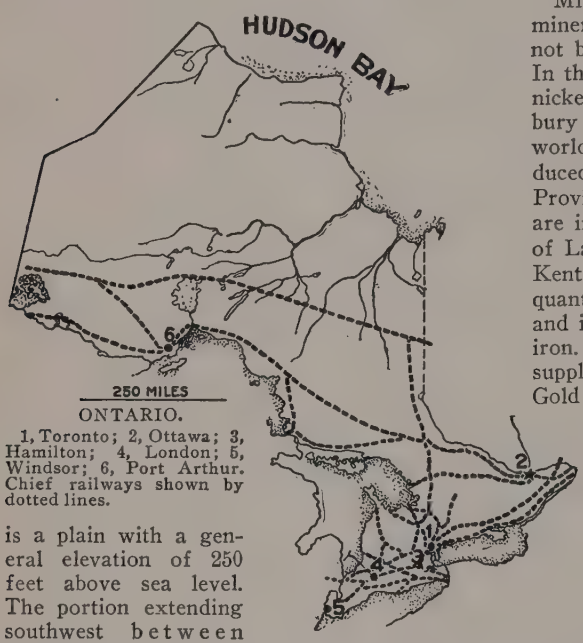
ONOMACRITUS (on-o-măk'ri-tus), a celebrated poet of Athens, where he resided in the 6th century B. C., in the time of Pisistratus. He was one of a commission of four to reëdit the poems of Homer with the view of systematizing them. It is said that Hipparchus detected him in the forgery of oracles, hence he was banished from Athens. Later he was reinstated as the friend of the tyrant, who induced him to endeavor to secure an invasion of Greece by Darius, for which purpose he used pretended oracles.

ONONDAGA (ŏn-ŏn-dą'gȧ), a tribe of Iroquois Indians of New York, who resided in the vicinity of Lake Onondago. They were peaceable and industrious and many were converted to Christianity. In 1660 they numbered about 1,650, but a large number went with Brant to Canada, where they were later assigned to the reservation on Grand River, Ontario. At present about 600 of these Indians reside in Canada and nearly 1,000 are on the reservation in New York.

ONTARIO (ŏn-tā'rĭ-ō), a Province of Canada, the most populous subdivision of the Dominion. It is bounded on the north by Hudson Bay and James Bay; east and northeast by Quebec; south by the Saint Lawrence, the Niagara, the Detroit, the Saint Clair, and the Rainy rivers and lakes Ontario, Erie, Saint Clair, Huron, and Superior, and the Lake of the Woods; and west by Manitoba and the international boundary line. The northeastern boundary is formed largely by Hudson Bay, which separates it from Quebec. The length from east to west is about 1,000 miles; the greatest breadth from north to south, about 700 miles; and area, 407,262 square miles, of which 2,850 square miles are water surface.

DESCRIPTION. The greater part of the surface is included in the Laurentian Plateau, which extends across the border from Quebec. It constitutes the divide between the water systems of the Hudson Bay and the Great Lakes, but the general altitude does not range more than from 800 to 1,200 feet. However, these highlands do not continue to the northern border, where a

considerable area is included in the lower valleys of the Moose and Albany rivers. In this section the surface slopes gently down to James Bay and the region is underlaid by horizontal strata of limestones. In the southeastern part are the lowlands of the Saint Lawrence. They are divided by a spur of the Laurentian Highlands, which cross the Saint Lawrence at the Thousand Islands, extending a short distance into New York. The western section of the lowlands extends along the shore of the Great Lakes, but is divided by the elevation of the rock known as the Niagara escarpment, which forms the precipice at Niagara Falls and extends to the Manitoulin Islands, in Lake Huron. Between the escarpment and the Laurentian spur



ONTARIO.
1, Toronto; 2, Ottawa; 3, Hamilton; 4, London; 5, Windsor; 6, Port Arthur. Chief railways shown by dotted lines.

is a plain with a general elevation of 250 feet above sea level. The portion extending southwest between lakes Huron and Erie, to the eastern border of Michigan, is known as the Western Peninsula.

The drainage is principally into the Great Lakes and the Saint Lawrence, but a portion of the northern part drains into Hudson Bay. The Albany River discharges into James Bay, the Ottawa River forms most of the boundary with Quebec, and the Rainy, Saint Mary, Saint Clair, Detroit, Niagara, and Saint Lawrence rivers are on the boundary with the United States. Among the principal streams in the extreme western part of the Province are the English, Moose, and Abitibi. The Thames flows into Lake Erie; the Petawawa, into the Ottawa; and the Maganetawan, into Georgian Bay. The French River is the outlet of Lake Nipissing, located northeast of Georgian Bay. Other lakes include Nipigon, north of Lake Superior; Simcoe, southeast of Georgian Bay; and Lake of the Woods, in the extreme west.

The climate is equable and healthful throughout, but the winters are severe in the northern part. Sudden and marked changes are not common in the region of the lakes, which have a marked modifying influence. In this section the thermometer rarely falls to 10° below zero and in the summer seldom rises to 92° above. Farther north the summers are warm and pleasant, but the winters are quite cold. Snow falls to a considerable depth in the northeast, but severe blizzards do not occur in any part. All sections of the Province have an abundant rainfall, which ranges from 30 to 40 inches. As a whole the climate compares favorably to that of the New England states and the northern sections of New York and Michigan. In the Western Peninsula the climate is most favorable for farming.

Mining. The Province is exceptionally rich in mineral resources, but the mining industry has not been developed to the extent of its possibility. In the vicinity of Lake Nipissing are the largest nickel mines in the world, known as the Sudbury mines, which produce nearly one-half the world's supply of this mineral. Petroleum is produced in greater quantity than in any other Province of the Dominion. The largest oil fields are in the region bordering on the south shore of Lake Huron, including Lambton, Essex and Kent counties. Copper is obtained in large quantities north of lakes Huron and Superior, and in the same fields are extensive deposits of iron. Ontario is rich in the deposits of salt, the supply being sufficient to endure for centuries. Gold and silver are mined on the western shore of Lake Superior. Gas fields of considerable extent abound in the vicinity of the Detroit and the Niagara rivers. Limestone, sandstone, marble, and granite are quarried extensively for building purposes. Other minerals include gypsum and mineral fertilizers and pigments.

Agriculture. Ontario has vast areas of fertile soil, but the more densely settled portions and those which have proved its chief source of wealth are included in the region that extends along the Saint Lawrence and thence west to Lake Huron. Here the climate is adapted to the growth of plants common to the Temperate Zone. Oats and hay are cultivated most extensively, but large interests are vested in the cultivation of wheat. Corn of a fine quality matures in the Western Peninsula, where the seasons are long enough and the sunshine is sufficient to make this cereal profitable. Peas are grown on a large acreage, the product being shipped to market or used as feed for cattle. Barley of a fine quality is grown and the quantity is such that it serves as the basis of a profitable malting industry. Large apple orchards and vineyards are found throughout the southern part and peaches are grown successfully in the region of the lakes. Other crops include rye, buckwheat, potatoes, turnips, and garden vegetables.

Large interests are vested in the rearing of

live stock. The Province excels in the quality of the various breeds that are raised. Cattle are grown both for meat and dairy purposes and the total has increased materially every decade. The number of cattle of all kinds is placed at 2,750,000 head. Swine and sheep rank next in number. Horses of a superior grade are grown for domestic use and export. Mules and goats are reared in small numbers, but large interests are vested in poultry.

Manufactures. The Province has an abundance of raw materials to stimulate manufacturing enterprises, but there is no supply of coal, and this essential commodity is imported largely from Nova Scotia and the United States. Vast forests of great commercial value, such as spruce, pine, cedar, poplar, and oak, supply a large quantity of material for milling and shipping. Pork packing and flour milling rank in importance next to lumbering. Large quantities of cheese and canned milk are produced and considerable interests are vested in the manufacture of cotton and woolen goods, machinery, hardware, and chemicals. Other manufactures include furniture, engines and boilers, tobacco and cigars, brick, wagons, clothing, rayon textiles, shoes, soap and candles, canned and cured fish, bread, paper, and automobiles.

Transportation and Commerce. Facilities for transportation are afforded by the Ottawa River along the northeastern border and by the extensive waterways of the Great Lakes and the Saint Lawrence River. The latter affords direct communication by the largest vessels with the ocean. Several important canals are maintained to avoid a number of falls and rapids in some of the waterways. These include the Welland Canal, about 27 miles long, which connects Lake Erie with Lake Ontario. The Province has transportation facilities by a number of trunk and many branch railways, including a total of 9,500 miles. Across the northern part, running nearly parallel to the Ottawa River, passes the transcontinental line of the Canadian Pacific Railway. Other lines include the Canadian National, the Central Ontario, the Wabash, and the Michigan Central railways. Electric lines are maintained to provide communication in the larger cities, with branches extending to many interurban points. Toronto, Ottawa, Hamilton, Saint Thomas, London, and Renfrew are the leading railway centers.

Ontario has developed an extensive domestic and foreign commerce since its union with the Dominion in 1867. Lumber and lumber products are exported in large quantities. Other exports include butter and cheese, grain, live stock, hides, cured and packed meats, and manufactured goods. Among the chief imports are coal, tea and coffee, and raw cotton. The merchant marine consists of about 1,850 steamers and vessels. A large share of the foreign trade is with Great Britain and the United States.

Government. The Lieutenant Governor is appointed for five years by the Governor General of Canada and is assisted by a council of eight members. This council consists of the attorney-general, commissioner of agriculture, treasurer, secretary, registrar, commissioner of crown lands, minister of education, and commissioner of public works. The legislative functions are exercised by an assembly of one house, chosen by popular vote, and made up of 98 members. All male British subjects who are 21 years of age are entitled to the right of suffrage. The highest judicial authority is vested in a supreme court of judicature, consisting of the high court of justice and the court of appeal. Local government is administered by the towns, municipalities, and counties.

Education. The system of public schools is maintained by general taxation, under the immediate supervision of the minister of education. Attendance upon the elementary schools is free and compulsory. As a means of safeguarding the interests of the French and those who have religious scruples in the matter of instruction, separate schools may be maintained by diverting a part of the taxes. The same privilege is extended to Protestants in communities where the Roman Catholics are in a majority, hence many communities have two classes of schools. Elementary instruction extends from the kindergarten to the high schools, the latter being generally maintained in the towns and cities. The qualifications of teachers are prescribed by law, but the details of administration are in the hands of the local taxpayers. A normal college and many model and normal schools are maintained, many of which are supported by the counties.

The University of Toronto, at Toronto, is at the head of the provincial system of education, but with it are affiliated a number of denominational institutions, including Knox College (Presbyterian), Victoria University (Methodist), Trinity University (Anglican), Wycliff College and Huron College (Anglican), and Saint Michael's College (Roman Catholic). Other institutions include the Upper Canada College, Toronto; the Ontario School of Mining and Agriculture, Kingston; the School of Practical Science, Toronto; the College of Music and School of Elocution, Toronto; and the Toronto Conservatory of Music. Ample provisions have been made for the care of the unfortunate and incorrigible. These dependents are generally in institutions which are supported by the Province, but the poor are generally provided for in the several counties.

Inhabitants. Ontario has a larger population than any other Province of Canada. The people are largely of English and Scotch descent, but include a considerable number of Germans, Irish, and other nationalities. Fully five-sixths are Protestants, including chiefly Methodists, Presbyterians, Episcopalians, and Baptists. In 1921 the population was 2,933,662. Toronto, on

Lake Ontario, is the capital and largest city. Ottawa, in the northeastern part, is the capital of the Dominion of Canada. Other cities include Hamilton, London, Kingston, Brantford, Windsor, Guelph, Saint Catharines, Berlin, Belleville, Kenora (Rat Portage), Chatham, Stratford, and Galt.

HISTORY. Champlain visited the region included in Ontario in 1615, but the first settlement was not established until 1673, when Frontenac built a fort at Kingston. The French established a settlement at Toronto in 1749, when they built Fort Rouillé as a protection and a means to prevent trade between the Indians of the north and the English on the south shore of Lake Ontario. Until 1791 the region now included in the Province belonged to Quebec, but in that year it was separated and called Upper Canada. Previous to that time it had been inhabited by a roaming tribe of Indians and for many years was important as a fur-producing district.

France was the recognized authority in Canada until 1763, when it was ceded to Great Britain by the Treaty of Paris. At the time of the American Revolution a large number of British loyalists settled within the region. Niagara was made the capital in 1792, but it was afterward removed to Toronto. An army of the United States invaded the Province during the War of 1812, in which occurred the battles of the Thames and Lundy's Lane, and in 1837 occurred the rebellion instigated by William Lyon McKenzie. It was organized under its present name in 1867, at the time of the Confederation. The Province has grown rapidly in wealth and population, though the most populous parts still remain largely in the region lying adjacent to lakes Huron, Erie, and Ontario. Within recent years a large influx of people has been attracted to the northwestern section. In 1912 a large portion of territory formerly included in Keewatin was annexed to Ontario.

ONTARIO, Lake, the smallest and most easterly of the Great Lakes of North America, which forms a connection between the Niagara and Saint Lawrence rivers. Its altitude above sea level is 247 feet and the greatest depth is 600 feet. The lake has a length of 190 miles and a breadth of 54 miles, and covers an area of 7,240 square miles. It has a number of important coast indentations and many islands, most of them being in the northeastern part. It is open for navigation practically the entire year, thus serving as a convenient and important commercial route, though at some seasons of the year storms of more or less violence prevail. The principal canal connections are with the Atlantic Ocean by the Hudson River and the Oswego and Erie canals, with Lake Erie by the Welland Canal, and with Ottawa by the Rideau Canal. Oswego is the most important lake port on its New York shore. The chief ports of Canada include Kingston, Hamilton, Coburg, and Toronto. Besides receiving the inflow of the Niagara River, it is fed by the Oswego, Genesee, and Black rivers. It has fine fisheries.

ONYX (ō′nĭks), a variety of quartz, consisting of layers that have different colors which are strongly contrasted, chiefly white and white with black, brown, or red. The layers are usually in even planes, hence it is specially adapted for cameos, for which purpose it was used by the ancients. The name is applied to chalcedony, jasper, and other crystalline minerals when they are strongly marked in colors of several shades. A species marked with white stripes alternated by red bands of carnelian is known as sardonyx, which is highly valued on account of its rarity. *Onyx marble* is a beautiful clear white stalagmitic carbonate of lime. It is of value in the manufacture of ornaments. A similar product, known as *Mexican onyx,* is found in Mexico, Arizona, and California. It is a banded species of aragonite.

ONYX MARBLE, the name of a variety of limestone beautifully colored by iron or manganese. True onyx is a banded variety of marble, while onyx marble is a cheaper grade of stone. It is used extensively in making paperweights, inkstands, table tops, and various decorative articles. This class of stone was quarried by the ancient Romans in Persia and Northern Africa. Deposits of it are found in Mexico and various parts of the United States, especially in Arizona, California, and Missouri.

OÖLITE (ō′ō-līt), the name of a variety of limestone, composed of rounded particles clustered together. Each one of the grains usually has a small fragment of sand as a nucleus, around which concentric layers of calcareous matter have formed. Several varieties have been classified, such as *roe stone,* in which the grains are rounded and very distinct, and *pea stone,* having grains about the size of a pea. The name Oölite is applied to a group of strata of the Jurassic period, immediately succeeding the Liassic period. See **Geology.**

OORI LIMPOPO (ō-ō′rē lĭm-pō′pō), or **Crocodile,** a river of South Africa. It rises in the Transvaal Colony, near Pretoria, thence flows northwest to the Transvaal boundary, whence it makes a semicircle until it enters the Indian Ocean through the northern part of Delagoa Bay. The entire course is 980 miles, but the navigation does not extend farther than 250 miles from its mouth, being obstructed at that point by rapids and falls. It has a number of tributaries, the most important being the Olifant River. The lower valley in Portuguese East Africa is level, but the upper course is through an elevated region.

OPAH (ō′pä), or **Kingfish,** the name of a fish found in the waters of the Arctic and Atlantic oceans. It has an oval-shaped body, is from four to five feet long, and has a powerful tail. The color is brilliant, ranging from greenish to golden above and yellowish-green below.

It is esteemed for its flesh. Locally it is sometimes called *moonfish,* or *mariposa.*

OPAL, a precious stone, consisting mainly of silica with about ten per cent. of water. It is very brittle and is distinguished by its reflection of light of many colors. Opals do not occur as crystals and their value depends upon the display of delicate colors, the finest grades constituting valuable gems when cut. They are usually prepared with a convex surface, since they display the colors to the best advantage in that form. Opals of a fine quality are produced in Hungary, the East Indies, South America, Saxony, and many other regions, and occur generally in sandstone having the nature of iron.

The species of opal are very numerous. They include the *common opal,* a grade having yellow, white, green, brown, or red colors, but not displaying them; *semiopal,* which is nearly opaque; *fire opal,* a grade giving only red reflections; *menilite,* a variety slightly translucent or opaque, but formed in irregular masses; *hydrophane,* which is transparent only when placed in water; and *precious* or *noble opal,* the grade reflecting brilliant and changeable colors of red, blue, green, and yellow. Precious or noble opal is the most valuable. A noted specimen of it is owned by the imperial family of Austria. This gem has a length of five inches, a width of about three inches, and a thickness of about one inch. The ancients attributed magical properties to opals. In the time of the Romans they were held in high esteem. It is said that Mark Antony was desirous of possessing an opal belonging to the Roman senator Nonius, but the latter preferred exile to parting with it, and Pliny ascribes to this particular gem a value of $500,000.

OPERA (ŏp'ĕr-à), the musical form of drama which is composed of quartets, trios, duets, solos, recitatives, choruses, and finales, or a variety of them. Instrumental music accompanies an operatic entertainment throughout. The musical part is variously combined and modified to produce certain desired effects. The whole is preceded by an instrumental overture or introduction, as is usually every act or division. Costumes and scenery are employed to heighten the dramatic effect, though these are not absolutely essential. *Grand opera* relates usually to serious themes, but sometimes it is either comic or tragic. On the other hand, *opera comique* is light and fanciful. The Italian drama, known as *romantic opera,* is an intermixture of the lively and the grave. *Opéra bouffe* is a farcical form of opera.

The three recognized schools of opera are Italian, German, and French, but they have been modified more or less to suit the taste of various countries. The Italian opera was developed largely from the miracle plays of the Middle Ages and dates from the 16th century, when the classical story of *Daphne* was reduced to a drama by Rinuccini, which Peri soon after set to music. However, the real founder was Scarlatti (1659-1725), who wrote a number of productions that created a widespread interest. Rossini is regarded the most purely Italian operatic composer, and "The Barber of Seville" and "William Tell" are his best productions. Other famous composers of this school include Piccini, Cimarosa, Jomelli, Bellini, Verdi, and Donizetti.

The German opera developed principally from the Italian, but in later times assumed an independent form and is now the highest in point of perfection. Dresden and Vienna were the first centers in which Italian operatic plays were transplanted, but at Hamburg a profound interest was developed by Reinhard Keiser (1674-1739), who wrote about one hundred operas. Mozart is among the eminent German operatic masters, giving Germany the first national opera, entitled "The Magic Flute." Beethoven is famous for his "Fidelio," and Von Weber in his "Der Freischutz" gathered with masterful effect the national folklore. Others of the school include Handel, Gluck, Flotow, Meyerbeer, and Wagner. The *melodrama,* a musical drama interspersed with spoken dialogue, is of German origin.

The opera was taken to France by Cardinal Mazarin in 1646. In the French school recitatives are prominent features, while special stress is laid on theatrical exactness. Among the principal composers of France are Monsigny, Rousseau, Auber, Hérold, Gounod, Hervé, Bizet, Offenbach, and Lecoq. Much of the writings of Meyerbeer and Handel was incorporated with the French. The opera in England was developed chiefly from the German and Italian by Purcell. Handel aided in making it popular by adapting a number of compositions from the German. The English operatic composers include Wallace, Balfe, Mackenzie, Macfarren, and Sullivan. Operatics became popular in America about 1825, since which time many noted productions appeared. Among the leading American composers are Damrosch, Reginald De Koven, Sousa, and Fry.

OPÉRA BOUFFE, a form of opera in which the music and character are light, farcical, and burlesque. It is generally termed *musical comedy,* when the dialogues are interspersed with musical selections. This form of the opera has become popular in America and Europe within recent years. The plays that may be classed as opéra bouffe include George Ade's "The Sultan of Sulu," Victor Herbert's "The Idol's Eye," Reginald De Koven's "Robin Hood," and William Schwenk Gilbert's "The Mikado."

OPERA GLASS, a double telescope of small size for magnifying a large field of view, used chiefly by spectators in attending theater or opera, hence its name. The opera glass permits the use of both eyes. Most opera glasses have a magnifying power of two or three times. They have a plano-concave or double-concave eye-

glass, so that the image is not inverted and little light is lost, thus securing much distinctness. The principal manufacturers of opera glasses are in Europe, the largest establishments being located in Paris. *Field glasses* are the finest class of opera glasses. They have both achromatic eye lenses and object lenses.

OPHICLEIDE (ŏf'ĭ-klīd), a wind musical instrument of the trumpet class, having a loud tone and a deep pitch. It is usually large in size, is made of brass, and is used in military bands. In length it varies from two to four feet. It consists of a conical tube, fitted on one end with a mouthpiece and terminated at the other in a large bell like that of a horn. The compass is about three octaves.

OPHIR (ō'fẽr), a name applied in the Bible to a region from which Solomon secured precious stones, gold, sandalwood, and other valuables, but its exact location has continued to be a matter of conjecture. The Bible specifies that Solomon's vessels were fitted up in the harbors of Edom and that three years were required to make the voyage. Some writers think that the name Ophir applied to a locality in Eastern Africa, others have expressed the view that India was meant, and Josephus ascribes to Malacca that distinction. Within recent years it has been asserted by a number of travelers that the Ophir of Solomon was in the regions of South Africa which is now included in the Transvaal Colony. This view is expressed because traces of gold and silver mines have been found in that part of Africa which were worked in ancient times.

OPIE (ō'pĭ), **John,** portrait and historical painter, born in Cornwall, England, in May, 1761; died April 9, 1807. His taste for drawing and historical study was developed early, and at the age of twelve he opened an elementary evening school. In 1780 Doctor Wolcott, commonly known as Peter Pindar, gave him substantial aid to train himself by study and practice in London. His paintings of greatest note include "Presentation in the Temple," "The Slaughter of Rizzio," "Juliet in the Garden," and "Jephtha's Vow." He lectured on art, wrote "The Life of Reynolds," and illustrated Macklin's "Poets and Biblical Gallery" and Bowyer's "English History." His wife, Amelia Opie (1769-1853), attained a reputation as a novelist. The best known of her writings include "Tales of the Heart," "The Father and Daughter," "Valentine's Eve," "Detraction Displayed," and "Lays of the Dead."

OPIUM (ō'pĭ-ŭm), the milky juice obtained from the unripe capsules of several species of the poppy, which is rendered concrete and dark colored by exposure to the air. The poppy is cultivated in many places as a garden plant for its beautiful single or double flowers of white, violet, red, or variegated colors, but in Turkey, India, China, Hindustan, and other countries it is grown evtensively in plantations for its yield of opium. Poppies require a rich soil to mature to their best form. In many localities irrigation is utilized to supply an abundance of moisture. The time of sowing varies somewhat in different regions, owing to a difference in latitude, but the plants mature sufficiently in about three months to supply conditions favorable for collecting the milky juice from the heads or capsules, then about the size of a small hen's egg. At that time incisions are made in the unripe capsules with a small instrument having several little blades. After allowing the juice to exude and dry over night, it is collected in an earthen vessel by scraping it from the capsule with a blunt knife. It is next dried uniformly, being turned at frequent intervals for that purpose. When the moisture has sufficiently evaporated, it is taken to the factory, where it is treated in vats, made into small tablets or balls, and boxed for the market.

OPIUM POPPY.

Chemically opium is a mixture of alkaloids, the chief of which are morphine, narcotine, and codeine, with various organic acids. These are valuable in medicine for their narcotic and sedative properties, as is also the drug itself. *Morphine* is a derivative of opium and laudanum is a simple tincture in spirits of wine. Opium has a faint smell, is bitter and acrid to the taste, and can be easily indented with the finger. Though serving as a useful medicine in producing sleep and allaying pain, it forms a very dangerous and harmful drug to those who acquire the habit of using it continuously. Shortly after taking opium there is a stage of increased mental activity, but this is followed by a relapse, nervousness, and depression, which the user seeks to overcome by taking another dose. The habitual opium taker becomes spare of body, his skin grows sallow, his appetite diminishes, and the functions of the vital organs are interfered with to a considerable extent.

Trade in opium has been forbidden in the United States since 1915. Canada prohibits its sale for smoking and restricts its use by levying heavy customs duties. Those smoking opium have a peculiarly constructed pipe in which they place a small quantity, about the size of a pea, the smoke of which is inhaled and then exhaled through the nostrils until the desired intoxication is effected. As the habit grows, larger quantities are required. Some users take two or more of the opium balls. Opium smoking is very prevalent in China, India, and other coun-

tries of Eastern Asia, where special pipes are made for the purpose and opium smoking rooms are maintained. India is the main source from which the Chinese secure their supply of opium. Under the British the trade in opium has been a government monopoly in India since 1793. China prohibited the importation of opium in 1796 and until 1839 made strenuous efforts to enforce the law, but the desire of Great Britain to promote commerce by maintaining its market in China for Indian opium products caused it to declare a war, forcing China to recognize and legalize the traffic.

OPORTO (ō-pōr'tōō), a city and seaport of Portugal, next in size to Lisbon, capital of the province of Minho, on the Douro River, 172 miles north of Lisbon. The site is a fine tract of land along the river, rising by successive terraces toward the inland. It has communication by steamboats and steam and electric railways. Several fine bridges cross the river, connecting it with Villa Nova de Gaia, on the opposite side. The noteworthy buildings include the Gothic Church of San Francisco, the bishop's palace, the Clerigos Church, the Crystal Palace, the commercial exchange, the government mint, the opera house, and the central railway station. It is a distinctly modern city and is regularly platted. It has systems of gas and electric lighting, sanitary sewerage, and stone and asphalt pavements. The manufactures include wines and liquors, cotton and woolen goods, boots and shoes, sugar, cork, tobacco products, ribbons, soap, hats, porcelain, machinery, and sailing vessels. It has a large export trade in oranges, port wine, and cereals. Oporto had a reputation as a commercial city in the time of the Moors, when it was largely in the hands of the Christians. It obtained historic importance by its strong fortifications that withstood many attacks during the Middle Ages, but was captured by the French in 1808. Later, in 1832, it was held successfully by Dom Pedro, the ex-Emperor of Brazil, against the forces of Don Miguel. The capital of Portugal was for some time at Oporto. Population, 1922, 213,214.

OPOSSUM (ō-pŏs'sŭm), a class of marsupial mammals which are native to America. They include a large number of species, ranging in size from that of a house mouse to that of a large cat. The hair is soft and wool-like and the color in most species is whitish-gray, with several stripes down the back. They live largely on trees, where they pursue insects, birds, and other forms of animal life for food, though some species partake of fruits and tender vegetable forms, while still others feed on crabs and crustaceans. From eight to fifteen young are produced by the female. The young are nourished in the pouch for some time, where they also seek safety in case of alarm. Some species do not have pouches, but, instead, carry their young on the back, the tail of the young being entwined around that of the mother. Most of the species are clumsy and awkward in moving from place to place while on the ground, but they have great activity and skill in moving among the branches of trees, being especially fitted for this by their handlike feet, which are adapted for grasping, and by reason of their prehensile tail. The *common* or *Virginia opossum* ranges from the central part of the United States to Brazil. It is whitish-gray in color, has black ears and feet, and is esteemed as food. The *murine opossum* is about the size of a house mouse and is found from central Mexico to Brazil. The term "playing 'possum" originated from the habit of the opossum of counterfeiting death when in danger. It is used to describe conduct or proceedings which are deceitful.

OPOSSUM.

OPPELN (ŏp'pĕln), a city of Germany, in province of Silesia, on the Oder River, 48 miles southeast of Breslau. It has communication by railroads and electric railways and is surrounded by a farming country. The chief buildings include the public library, the teachers' normal school, the gymnasium, and a school of agriculture. Among the manufactures are cigars, cement, clothing, furniture, and machinery. It has a large trade in grain and cattle. Oppeln was annexed to Prussia in 1742. A large proportion of the inhabitants are of Polish descent. Population, 1922, 30,765.

OPPER, Frederick Burr, illustrator, born in Madison, Ohio, Jan. 2, 1857. After attending public schools and working in a newspaper office, he went to New York City as an employee of a mercantile house. In the meantime he devoted his leisure to drawing sketches for comic newspapers. The popularity of his drawings induced him to attend an evening school at the Cooper Union Institute, where he studied to make that line his profession. In 1877 he was employed on Frank Leslie's publications, but became illustrator for *Puck* in 1880, remaining with that publication until 1899, when he was

given a like position on the New York *Journal*. His illustrations made the comic supplement of Hearst's newspapers popular, both from the fine humor displayed in his political cartoons and in the forcible execution of practical character sketches. He illustrated Peter Dunne's "Mr. Dooley" and Hobart's "Dinkespiel." His productions were published under the titles of "Puck's Opper Book" and "Folks in Funnyville."

OPPERT (ŏp'pĕrt), **Jules,** orientalist, born in Hamburg, Germany, July 9, 1825. He took a course in law at Heidelberg and subsequently studied oriental languages at Bonn and Berlin. In 1846 he was granted the degree of doctor of philosophy at the University of Kiel, and for several years taught German in the lyceums of Laval and Rheims. The French government made him a member of the expedition sent to Mesopotamia in 1851. On his return to France, in 1854, he submitted to the institute his system of reading Assyrian inscriptions. He was made professor of Sanskrit at the imperial library of Paris in 1857 and teacher of Assyriology in the College of France in 1869. In 1881 he was made a member of the Academy of Inscriptions. He published many works of value relating to oriental languages and contributed to periodicals. His "Grammar of Sanskrit" and "Expedition to Mesopotamia" have been translated into several foreign languages. He died in 1905.

OPTICS (ŏp'tĭks), the branch of science that treats of the properties of light and vision as pertaining to the human eye. See **Light.**

OPTIMISM (ŏp'tĭ-mĭz'm), the doctrine that everything in nature and the history of mankind is ordered for the best. It embraces the philosophical belief that the order of things in the universe is adapted to produce the highest good. This doctrine is of ancient origin and is supported by philosophers both of ancient and modern times. Leibnitz is the leading modern advocate of it. Its tenets are fully exemplified in his work entitled "Theodicae." Optimism stands opposed to pessimism, according to which the evil in this life overrules the good.

ORACLE (ŏr'ă-k'l), a term applied in classical antiquity to the seat of worship of some special divinity, where prophecies were given in answer to inquiries relating to some event or to some proposed course of action. Priests or priestesses usually announced the revelations, but in some cases they were given out by signs. The desire to avert threatened danger or secure success by penetrating into futurity has animated mankind in all ages of the world. Anciently people flocked from far and near to consult the oracles situated at different places, the advice and approval of these mouthpieces of the gods being deemed essential in all great undertakings, such as proposed conclusions of peace, declarations of war, the enactment of laws, and various personal matters.

The most famous Grecian oracle was that of Apollo at Delphi, where a priestess called Pythia, named after the serpent Python slain by Apollo, delivered the oracles. To prepare for the important task, Pythia first bathed in the waters of the Castalian spring, after which she was conducted into the temple by the priests, where she was surrounded by clouds of incense and uttered peculiar phrases, which the priests interpreted to the people as coming directly from the god Apollo. The Greeks had 22 oracles for the consultation of Apollo. Among the important oracles were those of Miletus and Argos, that of Zeus at Dodona, and that of Jupiter Ammon in the Libyan Desert. The people continued to consult the oracles until the time of Theodosius, who caused the prophetic deities to be destroyed and their temple to be closed.

ORAN (ō-răn'), a seaport city of Algeria, capital of the government of Oran, on the Gulf of Oran, an inlet of the Mediterranean Sea. The city is defended by several forts, has a beautiful location on the hills that form an amphitheater above the gulf, and its harbor is amply protected by moles. Though a North African city, it is largely European in appearance. It has good railroad facilities, electric lights, and other municipal improvements. The city has a well-organized school system, several colleges, a military hospital, a seminary, a Roman Catholic cathedral, and a number of mosques, churches, and synagogues. The export and import trade is extensive. Among the manufactures are tobacco products, utensils, wine and other spirituous liquors, clothing, toys, and earthenware. The Moors founded the city in the 15th century. It passed successively to the Spaniards, Turks, and French, the last named securing permanent possession of it in 1831. Fully three-fourths of the population are Europeans, mostly French. Population, 1922, 120,499.

ORANG, or Orang-Outang (ō-răng'ōō-tăng'), the name of an anthropoid ape, signifying "man of the woods," native to Sumatra, Borneo, and Malacca. This animal is confined to a single species. Like the chimpanzee and gorilla, it approaches in many respects the physical structure of man, though it is inferior to both these classes. The brain and spine are quite manlike. It is unable to walk with ease in an erect posture. At maturity it attains a height of from four to five feet. The hairs have a reddish-brown color, peculiarly resembling those of the people native to the countries where it is found, and the arms reach to the ankles when standing erect. The short hind limbs make it impossible to move with facility while on the ground, but when among the branches of trees the orangs pass rapidly from limb to limb, or swing themselves from one tree to another. They build nests in trees, where they live the greater portion of the time. At night they rest by sleeping on a rudely constructed bed or nest in the branches. Their intelligence and strength

are alike remarkable. When captured young, they may be domesticated and taught many skillful tricks. It is remarkable that the orang does

ORANG-OUTANG.

not live long in captivity. With the increase of age, the temper becomes quite disagreeable.

ORANGE (ŏr'ĕnj), a class of fruit trees of the order *Rutaceae,* including several species. These trees are related to the lime and citron. They are native to China, India, and other countries of Eastern Asia. The orange tree was grown for its fruit from remote antiquity, but

ORANGE.

it was not introduced into Europe until it was brought there by the Moors in the 14th century, and was first cultivated in Portugal about 1520. Since then it has been naturalized in all the warmer climates. Many species have been improved by careful propagation. The United States produces large quantities of oranges, the most productive plantations being in California, Florida, and Louisiana. Other countries taking high rank in the yield of oranges include Mexico, the West Indies, the East Indies, China, India, Australia, and North Africa. The orange tree is an evergreen. It has oblong, thick, and smooth leaves, bears fragrant white flowers, and grows to a medium height. The fruit has a bright yellow color, is globose in form, and has a thick rind and a pulp containing luscious juices. Some species have seeds while others are seedless. The trees bear in about six years and often live 600 years. Large specimens produce from 2,000 to 12,000 oranges in a year.

The wood of the orange tree is fine grained and smooth. It is of value in making fine cabinet work. Many species, some sweet and some bitter, have been originated by cultivation. The sweet oranges are most desired for eating, while the bitter yield flavoring and medicines. Among the common species sold on the market are the China orange, the Lisbon orange, the Maltese or red pulped, the Mandarin or clove, the Saint Michael, the Majorca seedless, the Tangerine, the Valencia, and the oval-shaped egg orange. A favorite species known as *navel oranges* is seedless. *Blood oranges* have a dark red juice. The *russets* are grown extensively in Florida. The fruit which is intended for distant markets is picked before fully ripened and wrapped in paper. It is shipped in boxes containing about 250 oranges. Fragrant oils are secured from the rind, leaves, and flowers. These oils are of use for flavoring and in perfumery. Orange blossoms are used extensively at weddings to decorate the bride. A drink called *curaçoa* is prepared from the oranges that are shaken from the tree by winds or otherwise before ripening.

ORANGE, a town of Massachusetts, in Franklin County, 85 miles northwest of Boston. It is located on Millers River and the Boston and Maine Railway. The public library has 8,500 volumes. Waterworks, electric lighting, and sewerage are among the public improvements. It has several parks and a number of fine school buildings. The manufactures include furniture, needles, sewing machines, boxes, tapioca, and machinery. It was incorporated as a town in 1810. Population, 1925, 5,141.

ORANGE, a city of New Jersey, in Essex County, twelve miles west of New York City. It is on the Erie, the Lackawanna, and several lines of electric railroads. The site is on elevated ground near the base of First or Orange Mountain. Llewellyn Park is a fine public resort of 750 acres. Among the notable buildings are the Stickler Memorial Library, the Masonic Temple, the First Presbyterian Church, the Seton Hall College, the Locke College for boys, the Columbus School Building, the Orange Memorial Hospital, and the House of the Good Shepherd. It has a fine public library and many social and religious organizations. The manufactures include felt-hats, hats, clothing, shoes, machinery, and earthenware. It has public wa-

terworks and well graded and paved streets. The place was settled in 1667, but was long a part of Newark, and was incorporated in 1806. Population, 1905, 26,101; in 1920, 33,239.

ORANGE, a river of South Africa, rising in the Drakenberg Mountains of Natal. After a course of about 1,000 miles toward the west, it flows into the Atlantic Ocean, between Cape Colony and German Southwest Africa. It drains a basin of 325,000 square miles. The volume of its water is reduced considerably during the dry season, but during the rainy season the river is navigable for a considerable distance, though there is a large bar obstructing its mouth. The Vaal is its principal tributary.

ORANGEMEN, the members of a society in Great Britain, officially called the Loyal Orange Institution. It was founded in the northern part of Ireland in 1795 and is composed exclusively of Protestants. The objects for which it was organized are to support and defend the reigning king or queen of Great Britain, the Protestant religion, the legislative union of Great Britain and Ireland, and the succession to the throne of the present royal family so long as it remains Protestant. It was named in honor of William III., Prince of Orange, who pledged the ascendency of Protestantism in Great Britain and Ireland at the time of the Battle of the Boyne, on July 12, 1690. Lodges of this society were established at different times in England and Canada, but it is confined chiefly to Ireland. Parliament suspended it from 1813 until 1828, owing to intrigues in the army, but it was revived soon after. The anniversary of the Battle of the Boyne, July 12, is known as Orange Day, on which public demonstrations take place.

ORANGE RIVER COLONY, a province of Great Britain in South Africa, situated between Cape Colony and the Vaal River. It is bounded on the north by the Transvaal Colony, east by Natal and Basutoland, south by Cape Colony, and west by Bechuanaland. The area is 50,392 square miles.

Description. The surface consists largely of a plain elevated from 3,000 to 5,000 feet above sea level. East of this plain, on the boundary with Natal, are the lofty Drakenberg Mountains, with altitudes of 7,000 to 11,000 feet. The larger part of the colony consists of a prairie country, but belts of timber are distributed along the streams and in the highlands. In general the slope is toward the east, all of the drainage belonging to the basin of the Orange River.

The southern part is drained directly by the Orange River, which forms the southern boundary. In the southeastern part is the Caledon River, a tributary of the Orange. The northern and eastern borders are formed by the Vaal, which receives the inflow from the Wilge, Rhenoster, Valsch, and Modder rivers. As a whole the climate is agreeable and healthful, but hot winds sometimes cause a sudden rise in the temperature. The mean temperature is 61° and the extremes range from 20° in June to 98° in January. Prolonged droughts frequently occur in the summer season, especially in January, but the rainfall is sufficient in most parts to insure the maturity of crops.

Productions. Agriculture and stock raising are the principal industries, but remarkable developments have been made in mining within recent years. Cattle are grown extensively on the grazing lands of the prairies, which are well adapted to the pastoral industry. The number of cattle is given at 750,500 head. Sheep raising represents extensive interests and 4,500,000 head are reported. Swine, horses, and poultry are grown with profit. Agriculture is developing rapidly, but irrigation is resorted to in some sections. The principal cereal crops include Kaffir corn, wheat, oats, barley, and rye. Vegetables and fruits yield large returns.

The colony has extensive mineral deposits. Diamonds are mined at Jagersfontein and Koffyfontein. Gold is mined in the foothills of the Drakenberg Mountains and a large coal field has been developed around Kroonstad, in the northern part. Salt is mined in several places. Limestone, granite, and clays are abundant. The output of diamonds is larger than that of any other minerals, having an annual value of $6,750,000. Manufacturing is confined chiefly to railway shops and the mines, but considerable quantities of earthenware and brick are produced.

Government. The colony is administered under a constitution granted in 1907, which vests the chief executive authority in the Governor. He is assisted by an executive council. The legislative functions are exercised by a legislative assembly of 38 members, elected for five years by popular vote. All laws must have the assent of the Governor, but his sanction must be reserved until the approval of the home government is obtained. A system of schools is maintained by the government and additional support may be voted by the local authorities.

Transportation. A railway extends through the central part of the colony, passing from the southwest toward the northeast and connecting with Port Elizabeth, on the southern coast of Africa. The Cape-to-Cairo Railway passes along the western border, furnishing direct connection with Cape Town, Mafeking, and other commercial centers. Several branches extend to inland ports. The railways are largely under ownership and control of the colony. Wool, diamonds, corn, hides, and live stock are exported. The imports consist chiefly of clothing and machinery. Much of the trade is with other sections of South Africa. The exports are mainly through Port Elizabeth and Cape Town. The railways are given at 850 miles and about 1,500 miles of telegraph lines are in operation.

Inhabitants. The people consist chiefly of natives and Europeans. Most of the Christians belong to the Dutch Reformed Church. A small

per cent. are Jews and Catholics. Bloemfontein, in the south central part, is the capital and largest city. Other cities include Kroonstad, Jagersfontein, Harrismith, and Ladybrand. The population in 1921 was 626,906. This number included 175,435 whites. The remainder are natives, mostly Zulus and Bushmen.

HISTORY. The region included in the colony was formerly populated by African tribes, but Boers from Cape Colony made extensive settlements in 1835 with the view of founding a republic. This movement, known as the Great Trek, caused much of the colony as well as Natal to be settled by Europeans and their descendants. The settlements were confined largely to the territory between the Orange and the Vaal rivers, and a republic was established in 1842. Some friction resulted between the new government and that of the British in Cape Colony. The British annexed the region then known as the Orange River Free State, but in 1854 it again became independent. The discovery of gold in 1887 caused a rapid settlement and development in many localities and this gave rise to local contentions. In 1899 a war broke out between the British and the Transvaal Republic, an independent state located north of the Vaal River. The Orange River Free State became involved in this war by reason of a defensive alliance between the two republics, and after a prolonged war the British annexed the territory in 1900, although President Steyn resisted by force of arms. In 1910 it was joined with Cape Colony, Natal, and Transvaal to form the Union of South Africa.

ORATION (ô-rā'shŭn), an elaborate discourse delivered in public, treating in a formal and dignified manner some important subject. An oration may be *informal* or *formal*, the former having reference to an address delivered without previous preparation, while the latter is one that has been prepared by the orator so as to express the sentiments in the most elegant language. In a *deliberative* oration the speaker endeavors to arouse his audience by convincing them of a truth, while in a *demonstrative* address he aims rather to please than to persuade. *Judiciary* orations are addressed by advocates to a court or jury and are characterized by a logical construction and earnestness.

Many orations are included in the literature of the world, a number coming down from an early date in the history of Greece, such as the *Philippics* delivered by Demosthenes against Philip of Macedon. Cicero's "Orations Against Catiline" are among the most famous that have come down to us from ancient Rome. Among the orators of antiquity may be mentioned Isocrates, Pericles, Cato, and Mark Antony. Burke and Pitt are among the eminent English orators. Those of America include Patrick Henry, Thomas Jefferson, John C. Calhoun, Daniel Webster, Stephen A. Douglas, Wendell Phillips, Rufus Choate, and Robert G. Ingersoll.

ORATORIO (ŏr-á-tō'rĭ-ō), a composition taken directly from Scripture or paraphrased upon some theme in sacred history. It is generally semidramatic and is arranged to include quartettes, trios, duets, solos, recitatives, choruses, and other forms of music. The oratorio is so named from the oratory of a church near Rome, the Church of Santa Maria Maggiore, where it was desired to make religious services attractive by presenting scenes from Scripture in the form of musical performances. The date of these performances is ascribed to the period intervening between 1571 and 1594, though Saint Filippo de' Neri is credited with having founded a congregation of oratory in Rome as early as 1540. The general interest attracted by this class of musical presentations of sacred subjects induced many eminent poets and composers to devote their attention to the production of oratorios.

Saint Filippo de' Neri induced composers to set to music many parts of scriptural history, among them the incidents connected with the Prodigal Son, of Job and his friends, and of the Angel Gabriel with the Virgin. Metastasio and Zeno prepared a number of oratorios and Sebastian Bach, in 1729, wrote his celebrated "Saint Matthew." Other notable productions include Handel's "Messiah" and "Israel in Egypt," Beethoven's "Mount of Olives," Mendelssohn's "Saint Paul" and "Elijah," Haydn's "Creation," and the celebrated "Passion of Christ," which is still popular above all others. Among the more recent oratorios may be named Liszt's "Saint Elizabeth," Paine's "Saint Peter," Sullivan's "Light of the World," Schumann's "Paradise and the Peri," Cowen's "Deluge" and "Ruth," and Mackenzie's "Rose of Sharon." Leopold Damrosch established the Oratorio Society of New York, the first American institution of that character, in 1873.

ORCAGNA (ôr-kän'yà), **Andrea di Cione**, poet and artist, born in Florence, Italy, in 1308; died about 1368. He was the son of a Florentine goldsmith, Maestro Cione, and his name was coined from *L'Archagnuolo*, meaning archangel. He was early trained for important artistic work, a training that can be traced in the delicate finish of all his sculptures. In 1335 he became architect of the Church of San Michael in Florence, where he produced his masterpiece, a splendid marble tabernacle. His paintings include the work done on the Church of San Maria Morella at Florence, where he frescoed, among other noted productions, "Christ and the Virgin" and the "Last Judgment." Besides his works in painting and sculpture, he attained to eminence by productions in architecture and poetry. Such masters of art as Angelo and Raphael studied his work with care. Boccaccio extended his memory in his "Decamerone."

ORCHARDSON (ôr'chērd-sŭn), **William Quiller**, portrait painter, born in Edinburgh, Scotland, in 1835. He studied in his native city,

where he painted portraits and scenes from real life, and in 1863 removed to London. In 1868 he became associated with the Royal Academy and in 1879 was made an academician. His works rank among the most excellently finished and finely colored of recent painters. The more noteworthy productions include "Napoleon on Board the Bellerophon," "The First Cloud," "Bill of Sale," "The Queen of the Swords," "Her Mother's Voice," "Christopher Sly," "Young Duke," and "Salon of Madame Recamier." He died April 13, 1910.

ORCHESTRA (ôr'kĕs-trȧ), the term applied to a body of instrumental performers in which the violin is prominent. More recently the name is given to a band of musicians performing in a theater, concert hall, or other place of public amusement, though formerly it was applicable only to performances of symphonies and overtures, especially to the accompaniments of operas, oratorios, cantatas, and masses. The term does not apply to a body of musicians using principally wind instruments, since such a body is more properly called a *band*. In the Greek theater the orchestra was that part of the edifice in which the chorus performed its dances and evolutions. It was circular in shape, was surrounded by steps, and extended in front of the spectators. In modern theaters the orchestra is the space between the audience and the stage allotted to the musicians. The name applies in concert rooms to a raised platform occupied by both vocal and instrumental performers.

ORCHIDS (ôr'kĭds), the general name of plants which belong to the family *Orchidaceae*. They include the most highly organized flowers among the monocotyledons. It is estimated that more than 400 genera and 6,000 species belong to this group of plants. Although many species are found in the Temperate Zone, they are most numerous and of larger size in the tropics. In very dry and cold climates there are only a limited number of species, where they grow in the ground as herbs or shrubs, but in warm and moist regions they are connected with rocks and trees and their roots do not draw moisture from the soil. Under such conditions they subsist on nourishment derived from the air. Orchids are especially abundant in the moist regions of the East Indies and the vast forests of the Amazon valley of South America, but they are well represented and of considerable size in the West Indies, Mexico, and Central America. Many species have been acclimated and are cultivated in gardens for the beauty and peculiar shape of their flowers. The flowers are fragrant, have bright colors, and are especially peculiar because of the various forms taken on by one of the six petals, which is known as its *lip* or *labellum*. In many American and European countries the culture of orchids has developed into an important industry. The form and size of the flowers produced by some cultivated species, such as the *dendrobium densiflorum* and the *calipso-borealis*, cause them to demand high prices. The roots and tubers of several species yield a nutritive substance known as *salep* and others yield vanilla.

ORCHIDS.
1, Dendrobium densiflorum; 2, Calipso-Borealis.

ORD, Edward Otho Cresap, soldier, born in Cumberland, Md., Oct. 18, 1818; died in Havana, Cuba, July 22, 1883. In 1839 he graduated at the United States Military Academy and afterward served against the Seminole Indians in Florida. During the Mexican War he was promoted to be a captain for services rendered at Monterey, Cal. He was made brigadier general of volunteers at the beginning of the Civil War, and later secured command of a brigade of Pennsylvania reserves. On May 2, 1862, he was promoted major general of volunteers, led the left wing of Grant's army at Iuka and Hatchie, and commanded at the siege and capture of Vicksburg and Jackson. He rendered valuable assistance at the evacuation of Richmond, in 1865, and was present at the surrender of General Lee. In 1866 he was mustered out of the volunteer service and was given an appointment as brigadier general in the regular army. Subsequently he had command of various military departments. In 1881 he retired with the rank of major general.

ORDINANCE OF 1787 (ôr'dĭ-nȧns). See **Northwest Territory.**

ORDINARY (ôr'dĭ-nȧ-rў), an official of an-

(Opp. 2048)

ORCHIDS.

1, Aganisia tricolor; 2, Coryanthes macrantha; 3, Miltonia Bunti; 4, Nanodes Medusae; 5, Dendrobium Brymerianum; 6, Brassia caudata var. hieroglyphica; 7, Cattleya Trianae var. purpurata; 8, Masdevallia spectrum; 9, Laelia elegans var. Houtteana; 10. Coelogyne pandurata; 11, Tahpinia Randi.

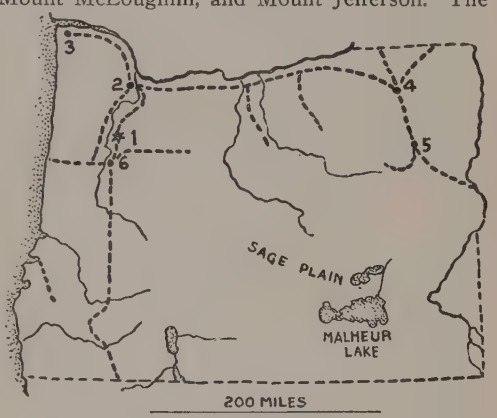
cient Rome, whose duty was to hear and decide the most important civil and criminal cases. The term was applied in England to a bishop, or his deputy, when acting as an ecclesiastical judge, but after the Reformation the jurisdiction of this officer was transferred to the civil courts. In the colonial period of Canada and the United States, the colonial governor was ex-officio ordinary, or head of the ecclesiastical courts, which then had jurisdiction of probate and some equity causes. In some states, as in New Jersey, the probate judge is still called an ordinary.

ORDOVICIAN (ôr-dô-vĭsh'ăn), the name of a system of rocks, classed by some writers as intermediate between the Cambrian and Silurian systems. The term is used more extensively in America than elsewhere. The system is divided into Trenton and Canadian strata, the latter being the lower and the former being the more recent. Both are again subdivided, the Canadian into *Beekmantown* and *Chazy* and the Trenton into *Trenton, Utica, Cincinnati,* and *Hudson* strata, though these names have a somewhat local significance. In general the ordovician rocks are chiefly limestones, but in some places they are made up largely of shales. Zinc and lead ores are common to the formations belonging to this system, as in Missouri and Wisconsin, while petroleum and natural gas occur to a considerable extent, as in Ohio and Ontario.

ORE, a natural substance found in the earth, which yields metals by applying various processes, principally roasting and smelting. The term is applied usually to a mineral from which the metal can be extracted profitably, but is sometimes extended to nonmetallic minerals, as sulphur ore. Metals occurring in a pure state free from other substances are called *native.* Ore consists of metals in combination with one or more of the nonmetallic elements, the principal combinations being metals with sulphur, forming sulphide; with chlorine, forming chlorides; with oxygen, forming oxides; and with carbonic, sulphuric, arsenic, silicic, and phosphoric acids, forming carbonates, sulphates, arsenates, silicates, and phosphates. Ores are commonly found in veins or lodes and in imbedded masses. A large part of the gold and silver bearing ores is of too low a grade to be profitable and many tons are dumped aside as valueless. It is possible that improved methods of cheapening transportation to the smelters and treating the ores when placed there will yet cause much of what now is valueless to be used profitably. An electrical process of treating low grade ores was proposed by Edison, though only partial success has yet been obtained by means of it.

OREGON (ŏr'ĕ-gŏn), a Pacific state of the United States, popularly called the *Beaver State.* It is bounded on the north by Washington, east by Idaho, south by Nevada and California, and west by the Pacific Ocean. The extent from east to west is 375 miles; breadth from north to south, 275 miles; and area, 96,069 square miles, including a water surface of 1,092 square miles. In size it ranks seventh among the states.

DESCRIPTION. The State is crossed by two ranges of mountains from the north to the south, the Coast Range and the Cascade Mountains. They trend parallel with the coast through the western part. In the northeastern section are the Blue Mountains, and in the southeastern part is a group known as the Steins Mountains. In general, the surface is uneven and rolling, with valleys along the streams and through the highland section. A narrow coast plain is located in some places along the Pacific, but in most sections the land rises abruptly from the sea to the crest of the Coast Range, which is about twenty miles inland, and the summits rise in altitudes of from 1,000 to 4,000 feet. The Cascade Mountains, located about 120 miles from the coast, are a continuation of the Sierra Nevadas. Mount Hood, the highest peak, is near the northern boundary and has an altitude of 11,225 feet. Other peaks are the Three Sisters, Mount McLoughlin, and Mount Jefferson. The



OREGON.

1, Salem; 2, Portland; 3, Astoria; 4, Pendleton; 5, Baker City; 6, Albany. Dotted lines indicate chief railroads.

mountains include a number of extinct volcanoes and some of them are snow-capped the entire year. Extensive forests of pine, fir, cedar, oak, ash, hemlock, maple, and cotton wood abound in the mountains and along the streams.

The drainage is principally into the Pacific Ocean by the Columbia River, which forms the greater part of the northern boundary. About half of the eastern boundary is formed by the Snake River, which receives the inflow from the Owyhee, Malheur, and Powder rivers and joins the Columbia in Washington. Among the streams flowing north into the Columbia are the Umatilla, John Day's, Deschutes, and Willamette rivers. The Rogue, Umpqua, Alsea, and Nehalem drain into the Pacific. A number of streams in the south central part of the State are inland, flowing into lakes that have no outlet to the sea. Lower Klamath and Goose lakes

extend across the border into California. Upper Klamath, Summer, Christmas, and Malheur lakes are located wholly within the State. Cape Blanco extends farthest west. The coast is not indented by any large inlets.

The climatic conditions are somewhat diversified, owing to the differences of altitude, periodical winds, and mountain barriers, but as a whole the State is healthful. Warm winds from the Pacific render the climate of the section west of the Cascades both mild and equable, the average temperature ranging from 42° in winter to 63° in summer. East of these highlands the thermometer registers as low as 28° below zero and in the summer rises to 95° and even 110° above. Rainfall is most abundant along the coast, where it ranges from 50 to 90 inches, but Tillamook County sometimes has 135 inches, while in the plateau of the eastern part it is very scant, usually from 10 to 15 inches. In the southwestern part precipitation rarely exceeds 10 inches, but the arid region has grasses of value for pasturage.

Mining. Many minerals of value are found within the State. The Blue Mountains, in the northeastern part, have gold deposits of much value. The output of this mineral is about $490,000 per annum. Silver is mined in many parts of the State. Lignite coal deposits occur in the Cascades and other localities and bituminous veins are worked to some extent. Limestone, sandstone, and granite are quarried extensively for building purposes. Large quantities of gypsum valuable for cement are found. Other minerals include nickel, iron, copper, zinc, lead, platinum, manganese, cobalt, and mineral waters. The output of the mines has shown a steady increase the last decade.

Agriculture. About twenty per cent. of the land area is included in farms, which are somewhat larger than the average farms in the East. In 1926, 1,250,000 acres were watered artificially. Irrigation is employed to a considerable extent in Harney County, for which purpose water is drawn from Harney and Malheur lakes. Wheat is cultivated on a larger acreage than any other crop, but it is followed closely by hay and forage. Oats are grown on a large acreage and yield well. Other farm crops include barley, potatoes, corn, and hops. The State holds a high rank in the yield of fruits, especially plums, prunes, apples, and grapes.

Live stock is raised in all sections of the State where settlements have been made. Sheep, horse and cattle ranching are the leading live-stock industries. The largest ranches are in the eastern portion of the State, where the natural grasses cure on the root and furnish nutritive pasturage the entire year. Dairy farming is confined principally to the Willamette valley. Large interests are vested in rearing horses and swine. The raising of mules has increased materially the last decade. Poultry of all kinds is grown profitably.

Manufactures. Large interests are vested in canning salmon along the Columbia River, which has some of the best fisheries in America. Considerable interests are vested in canning and curing sturgeon, halibut, and oysters. Astoria is the principal canning center. Lumbering is an important enterprise and large quantities of lumber and timber products are exported. The flouring and grist mill output ranks next to timber products in importance and it is followed closely by the slaughtering and meat-packing industry. Other manufactures include woolen goods, furniture, clothing, hardware, machinery, and iron and steel vessels. Portland is the most important manufacturing center.

Transportation and Commerce. Extensive shipping facilities are furnished by the Willamette and the Columbia rivers and the Pacific. The western and northern parts are quite well supplied with railway facilities, but the southeastern section is without railway communication. The line of the Oregon Railroad and Navigation Company extends through the State from east to west, following closely along the Columbia River, and numerous branches are operated inland. In the western part is the trunk line of the Southern Pacific, which furnishes direct connection with San Francisco and other cities of California. Several other lines pass into the State from Washington to Portland, which is the principal railroad center. They include 3,750 miles of steam and 600 miles of electric lines.

Fruits, grain, live stock, lumber, preserved meats, and fresh and canned fish are the chief exports. Various food products, clothing, sugar, and machinery are imported. The commerce carried on the Columbia and Willamette rivers is exceeded in importance only by that of the Mississippi River. Astoria, on the Columbia, Portland, on the Willamette, and Coos Bay, on the Pacific, are ports of entry.

Government. The present constitution was adopted in 1867, when the State was admitted. It vests the executive authority in the governor, secretary of State, treasurer, State printer, and superintendent of public instruction, each elected by the people for four years. The Legislature consists of two houses, the senate having 30 and the house of representatives 60 members. Members of both branches are elected by the people, the senators for four and the representatives for two years. Sessions of the Legislature are held biennially, beginning on the second Monday of September of even years. A supreme court of five judges has appellate jurisdiction to review causes. Five circuit courts are maintained, each presided over by one of the judges of the supreme court, and these have jurisdiction of civil and criminal cases. Other courts include the circuit, probate, and justices' courts. Local government is administered by township, municipal, and county officers.

Education. The rate of illiteracy based on the total population over ten years of age is 3.3

per cent., but it is smaller among the white inhabitants. A State board of education is composed of the Governor, secretary of State, and superintendent of public instruction, the last mentioned having direct supervision of the entire educational system. County and city superintendents supervise the schools within their respective localities. Women are eligible to become school directors and superintendents of schools. State normal schools of high class are maintained at Monmouth and Ashland, and normal instruction is likewise provided for in a number of private institutions. The University of Oregon, located at Eugene, is at the head of the educational system. Other institutions of higher learning include the Willamette University, Salem; the Pacific University, Forest Grove; the McMinnville College, McMinnville; the Philomath College, Philomath; the State College of Agriculture, Corvallis; the Lafayette Seminary, Lafayette; the Albany College, Albany; the Blue Mountain University, La Grange; and the Reed College, Portland.

Ample provisions have been made for the care of the unfortunate and incorrigible. Roseburg has a soldiers' home. The State constitution provides that the charitable institutions shall be located at the capital, hence Salem has the State penitentiary, the State hospital, the school for deaf mutes, the boys' reform school, and the school for the blind.

INHABITANTS. About half of the population is in the Willamette valley. The State was settled chiefly by immigrants from states farther east. Five reservations are maintained for the Indians, namely, Klamath, Umatilla, Grand Ronde, Siletz, and Warm Spring. A large majority of the people are Protestants, including the Methodist, Episcopal, Baptist, Presbyterian, and Congregational denominations. However, a considerable number of Roman Catholics reside within the State. Salem, on the Willamette, is the capital. Other cities include Portland, Astoria, Baker, Eugene, Pendleton, Albany, La Grange, Bend, and Oregon City. In 1900 the State had a population of 413,536. This included a total colored population of 18,954, of which 1,105 were Negroes, 2,501 Japanese, 4,951 Indians, and 10,397 Chinese. Population, 1920, 783,389.

HISTORY. The first European to visit the region of Oregon was Drake, who cruised upon its coast in 1579. Vancouver, an English officer, surveyed its coast in 1792. The United States claimed Oregon because of the Louisiana Purchase, but this claim was not recognized by England, and in 1818 a treaty of joint occupancy was agreed upon. Lewis and Clark surveyed the country in 1804 and 1806 and John Jacob Astor founded Astoria in 1811. Spain ceded the rights claimed to the Oregon Territory at the time of the Florida Purchase, in 1819. Russia ceded all claims in 1821 and France gave up title in the Louisiana Purchase, in 1803. In 1844 the occupation of Oregon entered into the political campaign with "fifty-four-forty or fight" as an issue, meaning that the United States should occupy the region as far north as 54° 40′ north latitude. The Democratic party being successful in that campaign, a war was threatened with England, in 1846, and soon after the boundary line was extended to the Strait of Juan de Fuca. Oregon Territory was formed in 1848. The present constitution was prepared in 1857 and two years later Oregon was admitted as a State. It is specially provided in the constitution that Negroes are prohibited from entering and residing in the State, but this clause is not enforced. In 1896 the Cascade Locks on the Columbia were completed. Woman's suffrage was adopted at the general election of 1912.

OREGON, University of, a coeducational institution at Eugene, Ore., established in 1872. It is at the head of the public school system and comprises the departments of literature, science and arts, commerce, law, journalism, engineering, medicine, dentistry, music, and teaching. The schools of law and medicine, though located at Portland, are an integral part of the university. Students are admitted on examination or by certificates from accredited schools. The library contains about 125,000 volumes. It has 215 instructors and an attendance of 3,870 students.

OREGON CITY, county seat of Clackamas County, Oregon, on the Willamette River, fifteen miles south of Portland. It is on the Southern Pacific Railroad and on several electric railways. The surrounding country is a fertile farming and fruit-growing district. An abundance of water power is derived from the Willamette River, which has falls of forty feet. Boats pass the falls by a system of locks. Among the chief buildings are the public library, the high school, the Masonic Temple, and the Hogg Building. The manufactures include flour, paper, woolen goods, machinery, canned fruits, and utensils. It has a growing trade in merchandise. Population, 1920, 5,686.

O'REILLY (ō-rī'lĭ), **John Boyle,** author, born at Dowth Castle, Ireland, June 28, 1844; died in Hull, Mass., Aug. 10, 1890. His father was an instructor at the Netterville Institution, Dowth Castle, where the son secured a liberal education. He learned to set type in a printing office and later became a reporter for various papers. He joined a British regiment in 1863 with the view of disseminating a sentiment favorable to revolution among the soldiers, and three years after was arrested on charges of high treason. After being found guilty on several counts, he was sentenced to life imprisonment, but this was afterward changed to twenty years service in the penal colony of West Australia, to which he was transported in 1867. Two years later he escaped by means of a small boat, and, being rescued, he was taken to the Cape of Good Hope, whence he went to America. He settled at Boston, where he edited *The*

Pilot, and in 1870 took a prominent part in the Fenian raid into Canada. Soon after he secured a controlling interest in *The Pilot,* to which he devoted much of his time. He published "Songs of the Southern Seas," "Stories and Sketches," "Statues in the Block," "In Bohemia," and "Songs, Legends, and Ballads."

OREL (år-yôl'), a city of Central Russia, capital of a government of the same name, at the confluence of the Orlik and Oka rivers. The surrounding country produces large quantities of hops, tobacco, cereals, and hemp, in which commodities it has a considerable trade. Among the noteworthy buildings are the public library, a theological seminary, the city hall, the central railroad station, and three *Realschulen.* It is a market for horses and other live stock. Among the manufactures are cordage, cotton and woolen goods, tobacco products, spirituous liquors, and machinery. It has convenient railroad connections and is joined by canal and river navigation with the Caspian, Baltic, and Black seas. Population, 1922, 78,468.

O'RELL, Max, the assumed name of Paul Blouet, author, born in Brittany, France, March 2, 1848; died May 24, 1903. He was educated in Paris, but entered the army of France to serve in the Franco-Prussian War. In 1870 he was made a prisoner at Sedan and, after being released, fought against the Commune in Paris, where he was wounded. His writings are humorous and sarcastic. Several of his works are founded on a trip made through Canada and the United States. They include "Jonathan and his Continent," "John Bull and his Island," "French Oratory," "Friend MacDonald," and "A Frenchman in America."

ORELLANA (ô-rål-yä'nà), **San Francisco,** soldier and adventurer, born in Truxillo, Spain, about 1490; died in Venezuela, in 1546. He accompanied Pizarro on his famous conquest of Peru, and in 1539 served as an official of the El Dorado expedition. In 1541 he descended the Napo River, in company with sixty men, for the purpose of securing supplies, but soon determined to proceed to its mouth. After three days he reached the Amazon River, and, coming in contact with the Indians, he was told of a tribe of female warriors, or Amazons, from which he named the great river. He was the first European to navigate that river to its mouth, reaching the Atlantic Ocean in 1541. Soon after he sailed to Trinidad and then to Spain, where a grant of land in the new world was given to him, and he was fitted out with a fleet of four vessels and 400 men. In 1544 he made an unsuccessful attempt to conquer the regions of the Amazon, but failed and was obliged to retreat to Venezuela, where his death occurred.

ORENBURG (å-rĕn-bo͝org'), a city of Russia, capital of a government of the same name, on the Ural River, near the Asiatic boundary. It is located on the slopes of a range of hills, has good railroad connections, and is the center of a large trade in cereals, live stock, and merchandise. The principal buildings include the arsenal, the public museum, the municipal theater, two gymnasiums, and a theological seminary. Among the manufactures are leather, clothing, cotton and woolen goods, soap, machinery, silk textiles, and ironware. The government of Orenburg has valuable deposits of salt, copper, gold, and iron. Orenburg was founded in 1742. Population, 1922, 94,086.

ORESTES (ô-rĕs'tēz), an important personage mentioned in Greek mythology. He was the son of Agamemnon and Clytemnestra and the brother of Iphigenia. It is related that Clytemnestra and her lover, Aegisthus, murdered Agamemnon while Orestes was still a youth, and that the latter was rescued from an early death by his sister, Electra. Later he and Pylades avenged the murder of his father, but thereby incurred the anger of the Furies and was pursued by them wherever he went, until he was informed by the oracle of Delphi that they could be pacified only by his conveying the image of Turian Artemis from Tauris to Attica. In this enterprise he was assisted by Pylades, who insisted in sharing the dangers of the undertaking, and the two proceeded to Tauris, where they were seized by the natives to be sacrificed in the temple of Artemis, but Orestes was recognized by Iphigenia as being her brother. His sister not only assisted them in escaping, but made it possible for them to capture the coveted image. Subsequently Orestes recovered the kingdom of Mycenae, lost at the death of his father, and, after the decease of the King of Argos, ruled that country. Aeschylus makes Orestes an important character in his tragedies, "Eumenides" and "Choëophori," Sophocles in his "Electra," and Euripides in his "Iphigenia in Tauris" and "Orestes."

ORGAN, a wind musical instrument, the largest and most important of all musical instruments. It contains a collection of metallic or wooden pipes, which are made to sound by means of compressed air from bellows, and is played through the agency of keys. The organ is of great antiquity and can be traced back to a small collection of pipes, from which it has gradually grown in size and number of pipes until now a single performer is able to call into use several thousand. The ancient Greeks and others of remote date employed water to graduate the pressure of the compressed air upon the pipes, which entered from a chamber, hence their instruments were known as *hydraulic,* or *water organs.* Instruments of this form were in common use among the people of wealth from the earliest history of the Grecians, and continued popular in the Roman and Byzantine empires and in the reign of Charlemagne.

Three essentials are employed in the construction of all organs, but to these have been added a variety of mechanical devices for the purpose of increasing the beauty and intensity of the

musical effect. These essentials consist of a *wind box* to contain compressed air, a number of *pipes* in communication with the wind box to produce musical sound, and a *keyboard* to supply communication at the pleasure of the player. After these essential parts of organ construction were perfected, additional progress was made by constructing instruments so that a single player could operate several instruments. Pedals were added as a means of using the feet, greater variety of tones were introduced, more power was centered in the bellows to supply a greater volume of air to the wind box, and finally the *sound-board* was placed at the upper part of the wind chest, a device by which air is conveyed to any particular pipe desired to be called into use.

The larger organs of modern construction are made of different systems of pipes, called *partial organs,* each of which is connected with a separate keyboard, often having four or five rows of keys, but all are in reach of the performer. A large church organ usually has three partial organs, the *great organ,* the *swell organ,* and the *choir organ.* A fourth, called the *solo organ,* is added to large concert organs and sometimes a fifth is placed at some distance from the others, called the *echo organ. Pedal organs* are attached to either the church or concert organs and are operated by the feet, having a keyboard for that purpose called a *pedal.* The keyboards to be operated by the hand are called *manuals,* or *claviers.* Each partial organ usually has a manual with a compass of five octaves, ranging from the C below the tenor C, while the pedal has a compass commonly of 27 notes, ranging from the C below the lowest manual C. The pipes range in length from less than one inch to 32 feet. They are divided into two classes, *reed pipes* and *flute* or *mouth pipes,* and the quality and character of their sound depend upon their dimensions, shape, and the material of which they are made. Air is admitted into the pipes by means of valves connected with the keys.

The several sets of pipes of each partial organ are called *stops.* Each stop has its own characteristic of tone, the quality of tone being designated as *clarinet, flute, diapason, trumpet, vox humana, oboe, violin, bassoon, dulciana,* etc. Most of the instruments have mechanical combinations by which several stops or pedals may be operated at once, organ couplers for joining keys in different manuals, swell pedals for increasing the volume, and tremulants for producing a trembling effect. The bellows for compressing air in the wind box are worked by hand in small organs, but in the larger instruments they are operated by a hydraulic or electric motor, or a gas engine. Organs of large dimensions are abundant in the cathedrals and churches of Europe and America. Among the largest in America are those in the Chicago Auditorium, the Cincinnati Music Hall, the Brooklyn Tabernacle, the Cathedral of Saint Patrick in New York, and the cathedrals of Boston and Montreal. The organs of much renown in Europe include those in Saint Peter's, Rome, in Notre Dame, Paris, and others at Haarlem, Seville, Strassburg, Utrecht, Berlin, Rotterdam, London, and Vienna.

The *reed* or *cabinet organ* is an American invention. The first instrument of this kind was made by Aaron M. Peasley in 1818 and became known as the *melodion.* In this class of instruments the bellows are worked by the feet and the reeds are generally worked on by suction instead of by blowing. Emmons Hamlin, in 1848, made an improvement by twisting and bending the reeds, thus increasing the capacity and quality of the tone. Extensive manufacture of this class of instruments began in 1854, when the Mason & Hamlin Organ Company commenced to place a superior article on the market known as the *American organ.* Since then these instruments have been improved in size and style, both of which are very various, and they have entered extensively into the homes and into missionary, Sunday school, and church work.

ORIFLAMME (ŏr'ĭ-flăm), the royal standard of the Capetian kings of France. Originally it belonged to the Abbe Saint Denis, near Paris, and was used in various religious ceremonies. Later it was carried by the counts of Vexin and, when Philip I. of France annexed Vexin to his dominions, it devolved upon him and his successors to carry the oriflamme. Louis VI. raised it for the first time in 1124, but it went out of use after the defeat at Agincourt in 1415. The banner was made of red silk, with two notches at its end, and was adorned with green silk tassels.

ORIGEN (ŏr'ĭ-jĕn), or **Origine,** a father of the church and one of the most learned writers of his age, born in Alexandria, Egypt, in 185; died in Tyre, Syria, in 254. He descended from Christian parents and, in 202, his father suffered martyrdom under Emperor Severus. The support of the family devolved upon the son, but he secured an education in Hellenic science and art under celebrated masters at Alexandria, and shortly after his father's death became catechist in the Alexandrian Church. Subsequently he was ordained a priest, led a life of rigid devotion, and even mutilated himself physically from an erroneous conception of the teachings expressed in Matthew xix., 12. He made a journey to Rome in 211, but the following year returned to Alexandria to engage as an advocate of the Christian faith, and in 228 was consecrated presbyter in Palestine. This distinction bestowed upon him caused the bishop of Alexandria to manifest a disposition of jealousy, and he was deprived of his priestly office and excommunicated in 232. However, the churches of the East remained his faithful supporters, and he was in great demand for service to the congregations in Palestine, Phoenicia, and Ara-

bia. Works to the number of 6,000 are credited to him. It is asserted that he employed constantly seven copyists and seven secretaries. Only a few of his works are extant, and those that have been translated are limited. The most important include his so-called "Hexapla" and "Tetrapla," both of which are important as biblical criticisms. Other works partly extant include treatises "On Prayer," "On Martyrdom," "On the Resurrection," and eight books against Celsus.

ORIGINAL PACKAGE, the term used in the United States to designate a shipment of goods that are inclosed in the covering in which they were packed at the time of being shipped from one state into another. Considerable interest has been attached to packages of this kind, especially where consignments of spirituous liquors are shipped into a state where the sale and manufacture of intoxicating beverages are prohibited by law. The courts held that under the Interstate Commerce Law a package so shipped could be sold without a violation of the state law. This gave rise to a considerable trade in liquor even in states that prohibited the liquor traffic, and large quantities were shipped directly to consumers in the original packages. However, this does not permit reshipping within the State where prohibition is in force.

ORILLIA, a town of Simcoe County, Ont., 68 miles north of Toronto, on the Canadian National and the Canadian Pacific railroads. The surrounding country produces honey, lumber, livestock, and farming products. It has flour and saw mills, foundries, tanneries, and fine schools. It was settled about 1845 and incorporated in 1867. Population, 1921, 8,774.

ORINOCO (ō-rĭ-nō′kō), a river of South America. It rises in the Parima Mountains, near the boundary between Venezuela and Brazil, and, after a course of 1,570 miles, flows into the Atlantic Ocean by an extensive delta, near the island of Trinidad. The Orinoco drains a basin of 366,000 square miles. It is remarkable for being connected with the Rio Negro, a tributary of the Amazon, by the Cassiquiari River, thus forming a natural canal between the two great river systems. In its upper course are several rapids and falls, from which it is navigable to the Atlantic, a distance of about 815 miles. The course is through a region of vast and luxuriant vegetation. It receives a large number of tributaries, among them the Guaviare, Meta, Ventuari, Caura, and Apuré rivers. In the rainy season, which occurs from May to January, there are vast floods, often covering an extent more than a hundred miles, and the delta assumes at that time the appearance of an extensive sea. The valley of the Orinoco includes vast tracts of forest, and on its banks are a number of ports and trade stations. Humboldt was one of the first explorers of the Orinoco.

ORIOLE (ō′rĭ-ōl), a class of small birds found in the Old World, but principally in Europe, Asia, and the Indian Archipelago. Several allied species are native to America, known as the *Baltimore oriole* and the *orchard oriole.* The orioles proper have a bright yellow color, but the wings and tail are black, and in size they resemble the thrushes, to which they are allied. More than twenty species have been described. The nests are built to hang from the smaller branches of trees. They have a loud, flutelike song and are prized as cage birds. The eggs are of a shining white color, sometimes tinged with pink, and have small, dark purple spots. These birds feed on insects, seeds, and fruits. See **Baltimore Bird.**

ORION (ō-rī′ŏn), a giant hunter mentioned in Greek mythology, reputed by Homer as the most handsome man in the world. He was born in Boeotia. Writers describe him to have been so large that he could wade the deepest seas. When on land, his shoulders reached the clouds, and, after falling in love with Eos (Aurora), he destroyed the wild beasts of the Aegean region for her protection. The father of Eos postponed the marriage until Orion became offended, and in a fit of inebriety his eyes were put out, but by exposing them to the rising sun his sight was restored. Subsequently Artemis slew him with an arrow, because the gods became offended on account of the love Eos bore him for his beauty. Some writers assert that he died by the sting of a scorpion, but all agree that he and the hounds that accompanied him in the chase were placed as a constellation in the heavens, known as Orion.

ORION, an ancient constellation, situated on the line of the equinoctial, visible at some season of the year in every land. In the wintry sky it becomes one of the most clearly defined and conspicuous constellations in the heavens. The outlines are marked by four brilliant stars in the form of a parallelogram, and near the center are three stars forming the *Belt of Orion.* The outline of this constellation is supposed to resemble the human form of the mythical giant, Orion, for whom it was named. South of Orion are four stars called the Hare, which form a beautiful figure resembling that animal.

ORISKANY (ō-rĭs′kā-nĭ), **Battle of,** an engagement of the Revolutionary War, fought about two miles west of Oriskany, N. Y., on Aug. 6, 1777. The Americans under General Herkimer numbered about 800. They undertook to relieve Fort Stanwix, which was besieged by a force of British and Indians under Sir John Johnson and Joseph Brant, but were attacked in a deep ravine. The battle raged for several hours, despite a severe thunderstorm, and both sides were badly disabled, but the Americans remained masters of the field. Saint Leger, who had been informed of the approach of Benedict Arnold, retreated toward Canada. General Herkimer was mortally wounded while in action.

ORIZABA (ō-rē-sä′vä), a city of Mexico,

in the state of Vera Cruz, sixty miles southwest of Vera Cruz. It is connected by railway with the principal cities of southern Mexico. The site is on an elevation 3,970 feet above sea level, but it is surrounded by a fertile country, producing cereals and fruits. Nearly all the buildings are one-storied, owing to the region being subject to earthquakes. Among the manufactures are cotton and woolen goods, tobacco products, leather, machinery, and earthenware. About 25 miles north of the city is Pico de Orizaba, an extinct volcano, having an altitude of 17,380 feet. Population, 1920, 32,894.

ORKNEY ISLANDS (ôrk'nĕ), an island group situated north of Scotland, separated from the mainland by the Pentland Firth, a channel averaging about seven miles in width. The group contains about 90 islands, of which 28 are inhabited. The total area is 375 square miles. Pomona, or Mainland, is the largest island. Others of considerable size include Hoy, Sanday, Westray, and Ronaldsay islands. The chief products include potatoes, barley, hay, oats, turnips, horses, cattle, sheep, swine, poultry, and many varieties of fish. Kirkwall and Stromness are the principal towns. Kirkwall, the capital, contains the Cathedral of Saint Magnus, founded in 1138, and a museum with many valuable antiquities. It is the center of a considerable trade.

The Orkney Islands were known to the ancient Greeks as the *Orcades,* but little is known of their inhabitants until about the time of the Middle Ages, when they were inhabited by Picts and Northmen. Harold Haarfager annexed them to Norway in the 9th century. They remained under the Scandinavian sovereigns until 1468, when they passed as a dowry with Margaret of Norway to James III. of Scotland. Since then they have belonged to Scotland and are now incorporated with Great Britain. They are governed as a separate county. The inhabitants consist of a mixture of Scandinavians and Scotch. Population, 1922, 31,045.

ORLANDO, a city of Florida, county seat of Orange County, 145 miles south of Jacksonville, on surfaced highways and on the Seaboard Air Line and the Atlantic Coast Line railroads. It is popular as a resort, owing to its fine climate, and is a prosperous commercial and industrial center. Population, 1925, 22,255.

ORLEANS (ôr'lĕ-ąnz), a city of France, capital of the department of Loire, on the Loire River, 72 miles southwest of Paris. It is an important railroad center, has canal connection from the Loire to the Seine, and maintains a convenient harbor on the river. The Loire is crossed by a number of splendid bridges, uniting the two portions of the city at convenient places. Orleans was formerly surrounded by walls, but these have been converted into boulevards. It has a fine public school system, a number of institutions of higher learning, and several parks, landscape gardens, and beautiful statues and monuments. Electric lights, a number of libraries, and several theaters and museums are maintained. The cathedral was partly destroyed in 1567 by the Huguenots, but was rebuilt by Henry IV., and besides it are several public buildings, including a palais de justice. The manufactures include hosiery, sugar, porcelain, bleached wax, cotton and woolen goods, vinegar, leather, machinery, and spirituous liquors.

Orleans was founded before the Christian era. The Gallic name, in 52 B. C., was *Genabum.* In 272 A. D. it was renamed *Aurelianum* by the Romans, from which its present name was formed. Attila besieged it in 451, but he was defeated by the Romans. Subsequently it passed successively into possession of the Franks and the Northmen, and in 1428 was relieved by Joan of Arc from a siege laid by the English under the Duke of Bedford. The German army occupied it in the Franco-German War, from 1870 to 1871, and made it the base of their operations against the French army of the Loire. Population, 1922, 78,614.

ORLÉANS (ôr-lâ-än'), **Duke of,** a title borne by three French dynasties. It was first given to Louis, second son of King Charles V., by his brother, Charles VI., in 1392. Louis afterward became regent and is an important personage in the history of France, being connected with the extended war between that country and England. Louis XII., grandson of Louis, became king in 1498, when the dukedom of Orléans was merged in the French crown. The title was revived in 1626, when Louis XIII. created his brother, Jean Baptiste Gaston, Count of Blois and Duke of Orléans and Chartres, but the latter died without male issue in 1660. Louis XIV. revived the title by creating his brother, Philippe, Duke of Orléans and Chartres. The latter married Henrietta, sister of Charles II. of England, and the son born to that union, Philippe, was regent of France during the minority of Louis XV. Louis Philippe Joseph, grandson of the regent Philippe, assumed the surname of Égalité and became King of France, but was guillotined on Nov. 6, 1793. The son of Égalité, Louis Philippe, became King of France in 1830. The Count of Paris is the present head of the royal family and royalist party of France, and is the grandson of Louis Philippe. He is likewise known as the Duke of Orléans. He was born in 1838 and is a man of considerable education.

ORLÉANS, Louis Philippe Joseph, Duke of, styled Philippe Égalité, born April 13, 1747; guillotined Nov. 6, 1793. He possessed much natural ability, but became engrossed in the gayeties of Paris, and for his extravagant habits he was looked upon with disfavor by Louis XVI. However, his liberality and support of public charities made him popular among the people. He spent some time in England, where he formed a friendship with the Prince of Wales, and, after returning to France, introduced horse

racing and other sports. In 1769 he married the daughter of the Duke of Penthièvre, and in 1771 began to circulate pamphlets and books devoted to liberal political views. He became a leader of the notables in favoring a national assembly, for which he was exiled in 1787, and in 1789 was instrumental in assisting to convert the States-General into a national assembly. His ambition was to become a constitutional King of France. With that view he went over to the revolutionary party in 1792, assuming then the title of Philippe Égalité, meaning Philippe Equality. He not only favored the execution of Louis XVI., but voted for it, though the Jacobins looked upon this act with disgust, and by it his safety was threatened. Soon after he was imprisoned at Marseilles, but was acquitted by the committee of safety. Later he was tried by the Revolutionary tribunal in Paris, when he was condemned as a Bourbon and executed on the same day.

ORLEANS (ôr'lĕ-ąnz), **Maid of.** See **Joan of Arc.**

ORMOND (ôr'mŭnd), **James Butler, Duke of,** Lord Lieutenant of Ireland, born in London, England, Oct. 19, 1610; died July 21, 1688. He descended from an illustrious family and was brought up under the supervision of the Archbishop of Canterbury, since his father, the Earl of Ormond, died while the son was quite young. He became commander in chief of the army sent in 1640 to suppress the rebellion in Ireland, and before the end of the year became lieutenant general of the kingdom. His service was marked with ability and his career was entirely satisfactory to the English, though the parties in Ireland took exceptions to his administration. In the long contest between Parliament and Charles II., Ormond sided with the latter, and the policy of Ireland was shaped with that view, but when the Parliamentary party attained success he crossed the channel into France. However, he soon after returned to Ireland for the purpose of restoring royal power, which he did by granting the Irish free exercise of their religion, though the peace that followed was not lasting. In 1650 he returned to France, where he gave support to the king during his exile. In the meantime he returned several times on secret missions to England to secure correct information regarding public sentiment. He took up his residence in England at the time of the restoration of the king, and subsequently served in his previous position of Lord Lieutenant of Ireland, where he remained until 1664. Colonel Blood attempted to assassinate him in London in 1670. The king conferred a dukedom upon him in 1683, after which he lived in retirement at Cornbury, but continued to advocate adherence to the Church of England.

ORMUZ (ôr'mŭz), or **Hormuz,** an island of Asia, in the Persian Gulf, near the coast of Persia. The surface is hilly and nearly destitute of vegetation, but it is valuable for the extensive deposits of sulphur, iron, and salt rock. The Portuguese took possession of the island in 1507, but it was captured by the English and Persians in 1622, since which time it has belonged to Persia. At one time it contained a town with 40,000 inhabitants, when it was the seat of a large inland and coastwise trade. At present the trade of the vicinity is confined to the port of Bender Abbas, on the mainland.

ORMUZD (ôr'mŭzd), or **Ormadz,** the supreme deity worshipped by the ancient Persians and their descendants, the Parsees and Ghebers. He is regarded the god of the firmament, the representative of goodness and truth, and is worshipped as the creator of the universe. Zoroaster (q. v.) taught that an incomprehensible being named *Ahura Mazda,* the eternal one, existed from all eternity and that Ormuzd came or sprang from him. His opponent, *Ahriman,* the evil one, corresponds to the Devil of the Christians, hence he is the antagonist of Ormuzd. They are opposing principles and are known as the king of light and the prince of darkness.

ORNITHOLOGY (ôr-nĭ-thŏl'ŏ-gў), the branch of zoölogy that treats of birds, their form, structure, habits, and classification. It is sometimes divided into *field* and *closet* ornithology, the former relating to the study of living birds from observation in their haunts and the latter, to the study of dead birds by dissection. See **Birds.**

ORNITHORHYNCHUS (ôr-nĭ-thŏ-rĭn'-kŭs), or **Duckbill,** an animal of Australia, the only genus of its class. It is characterized by webbed feet, a short tail, very small eyes, soft and close fur, and a beak with mandibles shaped like those of a duck. This animal and the porcupine ant-eater of Australia constitute the lowest species of mammals. The habits are aquatic, feeding on water insects, worms, and small mollusks. The feet have five developed toes and are well adapted to aid the animal in swimming and for making burrows in the banks of streams. In some instances they construct houses near the banks, which often attain a height of from fifteen to twenty feet above the surface of the water, and in the upper end they form a nest. Though the general structure of this animal is mammalian, it is oviparous and lays two eggs at a time. The young come forth in a blind and hairless condition and feed by sucking milk from the nippleless glands of the female. In the young the beak is short and flexible and is adapted for sucking.

ORONTES (ŏ-rŏn'tēz), the name anciently applied to a river in Syria, now called Nahr-el-Asi. It has its source between the Lebanon and Anti-Lebanon Mountains, courses toward the north to Antioch, and thence flows toward the west into the Mediterranean Sea. The course is about 215 miles, but it is not navigable. The valley of the Orontes is fertile, containing splendid clusters of figs, laurels, sycamores, and other trees and shrubs.

ORPHEUS (ôr'fē-ŭs), a hero of Greek legend, son of Apollo and Calliope, the muse of epic poetry. He is associated with many of the noted legends and several places claim the honor of his birth. His intellectual qualifications distinguished him, while his musical endowments made it possible to charm all nature. The wild beasts of the forest became tame and gentle as lambs under the influence of his music, the mad and rapid torrents stopped their turbulent course, and the mountains and trees moved from their places at the sound of his entrancing melodies. He became united in marriage to Eurydice, a beautiful nymph, daughter of the sea god Nereus, and their married life was full of joy and happiness. Shortly after their happiness was disturbed by Aristaeus, who endeavored to win the beautiful Eurydice. In an attempt to escape, she was bitten by a venomous serpent, from the effects of which she died.

The death of Eurydice caused Orpheus to engage in unceasing lamentations. He even ventured into the gloomy depths of Hades for the purpose of recovering her. While there he made such enchanting music by the sound of his lyre that the Furies shed tears and the wheel of Ixion ceased to revolve. At length the stony-hearted king of Hades permitted him to take Eurydice back to the upper world on condition that he must not look back until he reached the earth. This condition he violated and Eurydice vanished from his sight forever. Thereupon his grief became more intense than ever. He secluded himself from society and, when invited by women to join them in performing the rites of Bacchus, he refused and was torn to pieces in their mad fury. Greek writers generally represent that his remains were collected by the Muses and buried at the foot of Mount Olympus, where a nightingale warbled a funeral dirge over his grave. Orpheus is mentioned as early as 530 B. C. Many of the most beautiful hymns and poems of mythology make mention of his name and the devotion he bore to Eurydice.

ORRIS ROOT (ŏr'rĭs), the name of the dried root of the white iris, a plant native to the southern part of Europe. It has an aromatic odor and a subacrid taste and is employed in the manufacture of perfumery and tooth powder. In some places the rootstalks of the purple iris, or flower-de-luce, is used for the same purpose. The roots of some species of these plants contain much starch and are eaten.

ORSINI (ôr-sē'nē), the name of a family celebrated in the history of Italy, especially in the Middle Ages. This family possessed great wealth and political influence and became distinguished in the early part of the 12th century, when it furnished several members who rendered valuable services as soldiers to the Pope. Giovanni Gaetano, a representative of this family, became Pope under the name of Nicholas III., in 1277, but soon after the dignity of the family began to decline, owing to the feud between the Orsini and Colonna families. The Orsinis were Guelphs and favored the popes, while their rivals adhered to the Gibelline party.

ORSINI, Felice, eminent patriot, born in Meldola, Italy, in December, 1819; guillotined March 13, 1858. He studied law at the University of Bologna and in 1838 joined the Young Italy Society, which had been formed by Mazzini for the purpose of disseminating a revolutionary sentiment. He became identified with an insurrection in 1843 and the following year was sentenced at Rome to life imprisonment, but the amnesty proclamation issued by Pius IX. restored him to liberty. He was a prominent leader in the Revolution of 1848 and the following year became a member of the parliament at Rome, but was arrested a second time, in 1854, and the following year sentenced to be executed. He escaped a few months later by cutting the bars of the prison cell and fled to England, where, in 1856, he published "Austrian Dungeons in Italy." His lectures on the condition of political affairs in Italy and his own adventures were sufficiently interesting to the British public to become patronized by large audiences. On Jan. 14, 1858, he made an unsuccessful attempt to assassinate Napoleon III. by exploding several bombs near the carriage in which the emperor and the empress were driving. In this scheme he was assisted by Pieri, Rudio, and Gomez, three Italian refugees. Rudio and Gomez were sentenced to life imprisonment and Orsini and Pieri were executed.

ORTHOPEDICS (ôr-thō-pĕd'ĭks), the branch of medical science which relates to the prevention and cure of deformities in the human body. Originally it was applied only to this science as it relates to infants and children, but it is now extended to any age. However, no sharply drawn line has been established between general and orthopedic surgery. In general, it relates both to careful nursing and the treatment of deformities by mechanical means. Among the particular ailments with which it is concerned include rickets, bowlegs and knock-knee, curvatures of the spine and the arms, clubfoot, hammertoe, and diseases of the joints. Many instruments and much apparatus for treating these and similar ailments are sold on the market.

ORTHOPTERA (ôr-thŏp'tē-rà), an order of insects, including several thousand species. They are supplied with chewing jaws, two rather thick and opaque upper wings, and two larger thin plaited straight wings. The young, when first hatched, closely resemble the adult insects, except that they are wingless. Four groups are included in the order. These are known as the runners, the graspers, the walkers, and the jumpers. Among the familiar species are

the grasshoppers, crickets, praying mantis, leaf insects, walking sticks, and locusts. The grasspers are carnivorous and the other groups feed upon vegetation and household articles. This order includes some of the largest and strangest species of insects.

ORTLER (ôrt'lĕr), or **Ortler Spitze,** the name of a mountain of Austria-Hungary, in Tyrol, about 65 miles southwest of Innsbruck. It belongs to the Rhaetian Alps and is the highest peak in the empire, having a height of 12,795 feet. Explorers ascended it in 1804 and shortly after published an account of its extensive ice fields and imposing outlook.

ORTOLAN (ôr'tō-lạn), or **Ortulan,** a species of birds of the bunting family. It is native to Europe, Asia, and Northern Africa. The ortolan is a migratory bird, spending its summers as far north as the Arctic Circle and passing to the Mediterranean and countries of Southern Asia in autumn. The warble is pleasant and flutelike. Its length is about six inches, the color is yellowish-gray with brown wings, and the male has a particularly vivid hue. The bill is conical and small and the tail is somewhat forked. Large numbers of these birds are caught with nets as they migrate, since their flesh is valued for its delicious flavor. In many countries the captured birds are fattened before they are killed for table use. The ancient Romans were fond of the ortolans. They are still valued in Italy, Cyprus, France, and other countries, where they serve as a favorite food for epicures.

ORTON (ôr'tŭn), **James,** naturalist and author, born in Seneca Falls, N. Y., April 21, 1830; died in Peru, Sept. 25, 1877. He graduated at Williams College in 1855, studied theology at the Andover Theological Seminary, and in 1859 traveled in Europe and Asia. The following year he joined the Congregational ministry, became a teacher of natural sciences in the University of Rochester, and in 1869 was elected to the chair of natural history at Vassar College, a position he held until his death. He was given charge of an expedition sent by Williams College in 1867-68 to search for fossils in South America. After crossing the Andes of Ecuador, the expedition descended the Napo River to the Amazon, and returned to the United States by way of Lima, Peru. He made a second visit to South America in 1873, when he ascended the Amazon and explored the regions of its source, but died while passing over Lake Titicaca. His writings include "The Andes and the Amazon," "Liberal Education of Women," "Comparative Zoölogy," "Underground Treasures," "The Proverbialist and the Poet," and "Miners' Guide."

ORURO (ô-rōō'rô), a city of Bolivia, capital of a department of the same name, near the Desaguadero River, 25 miles north of Lake Poopo Choro. It is surrounded by a region containing vast deposits of gold, silver, lead, iron, copper, tin, and antimony. The lake has salty water and in its vicinity are productive salt deposits. Oruro was founded in 1590, when silver was discovered in the vicinity, and in the height of its prosperity possessed much wealth and a population of 70,000. Insurrectional movements and the discovery of mines of greater importance in the adjacent country have caused it to decline. Population, 1918, 18,766.

ORYX (ō'rĭks), a species of large antelope, native to the northern part of Africa. It has very long horns that curve backward and is distinguished by its whitish color. Large herds are met with in the Sudan and Nubia, where they are hunted for their flesh and skins. This animal belongs to the same genus as the addax, gemsbok, and beatrix antelope, but is larger in size.

OSAGE ORANGE (ō'sāj), a tree of the nettle family, so named from the Osage Mountains of Arkansas, where it is native, but it is

OSAGE ORANGE.
1, Fruit; 2, Flower.

also found in other regions of North America. The leaves are glossy and alternate. It bears a fruit which somewhat resembles an orange in size and color, but it is not edible. It attains a height of from fifteen to sixty feet, this depending upon climate and treatment, and yields a fine-grained yellowish wood that takes a high polish. The wood is used on account of its durability for paving blocks, fencing posts, and bridges. The leaves have been substituted for those of the mulberry as a food for silk worms, but the tree is used more largely for hedges. Its rapidity of growth, thorny branches, and ability to bear dwarfing make it of special value for all classes of hedge fencing. It may be propagated by cuttings of the roots, but for hedging the plants are grown from the seed and afterward are transplanted.

OSAGE RIVER, a river of the United States, having its source in eastern Kansas. After a tortuous course of about 500 miles it

flows into the Missouri River at Osage City, some distance below Jefferson City, Mo. It is joined by a number of tributaries in Missouri and courses through an agricultural and mining country. In its valley are extensive forests. The Osage valley is highly fertile, producing cereals, grasses, and fruits.

OSAGES, an Indian tribe of North America, belonging to the Dakota family, first met by Marquette on the Missouri in 1673. Later they occupied the regions of the Arkansas and sided with the French against the English. In 1808 they ceded a part of their land to the government and made several subsequent cessions. At the beginning of the Civil War, in 1861, 1,000 Osages moved toward the south, but entered into a treaty in 1865, and in 1870 they conveyed their lands to the government and removed to Indian Territory, now Oklahoma. The Osages have prospered under governmental supervision. They include a large per cent. of persons who are advanced in educational and industrial arts and possess valuable cultivated lands. Several literary works have been translated into their language.

OSAKA (ō′zä-kä), or **Ozaka,** a city of Japan, on the island of Hondo, 28 miles southwest of Kyoto. It has a fine location on the estuary of the Yodogawa, is a free port city, and has communication by canals and railways. The surrounding country is fertile and produces large quantities of tea and cereals. All the principal streets are clean and regularly platted, intersecting each other at right angles. It has manufactures of toys, machinery, clothing, cigars, edged tools, earthenware, and food products. Among the important buildings are the mint, a government college, a number of public schools, several colleges and hospitals, and about 1,400 Buddhist temples. Electric lights, telephones, waterworks, and street railways are among the improvements. It has a large trade in rice, tea, leather, and various manufactures. Population, 1922, 996,508.

OSCAR I. (ŏs′kẽr), **Joseph Francis,** King of Sweden and Norway, born in Paris, France, July 4, 1799; died July 8, 1859. He was a son of Charles XIV., who was known as Jean Baptiste Jules Bernadotte, and became Crown Prince of Sweden at the election of his father to the throne. He studied at the University of Upsala, where he developed remarkable ability in literature, science, and fine arts. In 1823 he married Josephine Beauharnais, granddaughter of Empress Josephine, and at the death of his father, in 1844, succeeded to the throne. His reign was one of liberality and justice, in which he gave liberal support to education, fostered manufactures, extended the civil rights of his subjects, and encouraged railroad building and other improvements. At the time of the Crimean War he declared the neutrality of Sweden, but his administration was adverse to Russia in sentiment. He published several treatises on penal law and education and wrote a number of songs, marches, and hymns. He had three sons —Charles XV., Oscar Frederick, and Augustus. The first named succeeded him as King of Sweden and Norway.

OSCAR II., Frederick, King of Sweden and Norway, born in Stockholm, Sweden, Jan. 21, 1829; died Dec. 8, 1907. He was a son of Oscar I. and a brother of Charles XV. After studying at several noted institutions, he entered upon extensive foreign travels. In 1857 he married Sophia, daughter of William, Duke of Nassau. On Sept. 18, 1872, he succeeded Charles XV. as King of Sweden and Norway. By a line of encouragement to railroad building, manufactures, and agriculture he gave to his dominion a prosperous reign from the first. He made an extended visit to Norway and Lapland in 1873 and to Germany and Russia in 1875. Norway and Sweden were separated in 1905, but his conciliatory policy averted a war between the two countries. He was succeeded as King of Sweden by his son, Gustaf V. King Oscar published a biography of Charles XII. and translated Goethe's "Tasso" and "Faust." He wrote a volume of poems and prepared many able documents relative to national affairs.

OSCAR II.

OSCEOLA (ŏs-sẽ-ō′lä), noted chief of the Seminole Indians, born in Georgia in 1804; died Jan. 30, 1838. He was the son of an Englishman named Powell and of a chief's daughter. In early infancy he was taken to Florida, where he was brought up by the Indians. His training was devoted chiefly to the art of warfare and he became influential among the Seminoles. He married the daughter of a fugitive slave, who was taken from him in 1835, and for threatening to revenge those implicated he was imprisoned by General Thompson. Six months later he killed the general and four others at Fort King and thereby brought on the Second Seminole War. The everglades of Florida were his stronghold, where he headed a band of several hundred Indians and fugitive slaves and succeeded in battling successfully against superior numbers for nearly two years. General Jessup took him prisoner in October, 1837, but this was done while he was holding a conference under a flag of truce. Osceola was imprisoned in Fort Moultrie, near Charleston, where he remained until his death.

ÖSEL (ē′zęl), or **Oesel,** an island in the Baltic Sea, at the entrance to the Gulf of Riga,

belonging to the Russian government of Livonia. The area is 995 square miles. It is hilly and undulating in many parts, but has marshy tracts of considerable extent. The soil is fertile and produces wheat, oats, and fruits. Fishing and the raising of cattle and horses are important industries. Arensburg, on the coast in the southeastern part, is the principal town. Denmark had possession of the island until 1645, when it was ceded to Sweden, and in 1721 it became a part of Russia. The inhabitants consist largely of Esthonians. Population, 1922, 57,812.

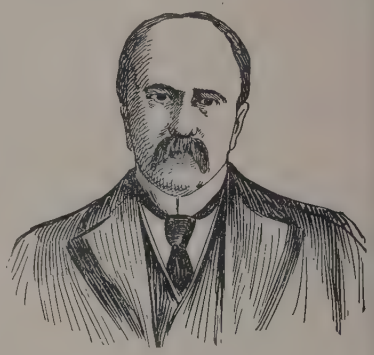
OSHKOSH (ŏsh'kŏsh), a city of Wisconsin, county seat of Winnebago County, on Lake Winnebago, at the mouth of the Fox River, eighty miles northwest of Milwaukee. It is on the Soo Line, the Chicago and Northwestern, and the Chicago, Milwaukee and Saint Paul railroads. Intercommunication is by a system of electric railways. Among the manufactures are lumber products, flour, ironware, matches, furniture, coffins, vinegar, caskets, paints, packed meats, machinery, vehicles, and tobacco products. The noteworthy buildings include the county courthouse, the public library, the high school, the Saint Mary's Hospital, and the State normal school. Near the city are the Northern Hospital for the Insane and the county poor farm. The trade in live stock, lumber, and manufactures is extensive. Within recent years it has developed a wide popularity as a summer resort, owing to its proximity to the lake and its numerous facilities for entertaining visitors. The site of Oshkosh was first settled in 1836 and it was incorporated as a city in 1853. Population, 1920, 33,162.

OSIER (ō'zhẽr). See **Willow.**

OSIRIS (ō-sī'rĭs), an eminent Egyptian divinity, the brother and husband of Isis and father of Horus. He was associated with Isis as a benefactor of Egypt in the introduction of religion, law, arts, and sciences. The Egyptians attributed to him the office of judging the dead and regarded him the ruler of the kingdom in which souls are admitted to enjoy eternal felicity. Many of the writings of the Egyptians and Greeks mention him. He is spoken of as the eternal ruler, manifester of good, king of the gods, and president of the west. These appellations and many others are found among the hieroglyphics on monuments accompanying his figures and the funeral rituals recorded on papyri apply many others to him. Writers generally agree that Set, his brother, was the representation of the sum of evil agencies and that he killed Osiris. He was held sacred under the form of a human figure with a bull's head, or as the sacred bulls Apis and Mnevis. Under the form of the sacred bull Apis he was supposed to be ever present among men. The tamarisk, evergreen, and the sacred ibis were regarded his symbols. Osiris was not only worshiped in Egypt, but in Greece, Rome, and Asia Minor, though with the rise of Christianity he fell into disrepute. The "Book of the Dead" gives an account of the pilgrimage of the dead to Hades, where they are to meet Osiris before the judgment seat.

OSKALOOSA (ŏs-ka-lōō'sa), a city in Iowa, county seat of Mahaska County, 58 miles southeast of Des Moines. It is on the Minneapolis and St. Louis, the Chicago, Burlington and Quincy, and the Chicago, Rock Island and Pacific railroads. The surrounding country is agricultural and stock raising and contains extensive deposits of bituminous coal. It has motor bus lines, sewerage, and public waterworks. Among the manufactures are tile, ironware, machinery, tobacco products, steam heaters, and earthenware. The principal buildings include the county courthouse, the public library, the high school, and several churches. It is the seat of Penn College, a Friends' coeducational institution founded in 1873. A statue of Chief Mahaska is located in the city park. The city has a large trade in coal and merchandise. It was settled in 1853 and incorporated in 1863. Population, 1905, 10,203; in 1925, 10,331.

OSLER, William, educator and author, born in Bondhead, Ontario, July 12, 1849. He studied at Trinity College, Toronto, and McGill University, Montreal, and subsequently took courses at London, Berlin, and Vienna. From 1874 until 1884 he was professor of the Institutes of Medicine at McGill University, and in the latter year was made professor of clinical medicine at the University of Pennsylvania, remaining there until 1889, when he became professor of medicine at Johns Hopkins University. He filled the last mentioned position with much ability until 1904, when he accepted the appointment of Edward VII. as regius professor of medicine at Oxford, England. He is noted as a lecturer and writer of ability. In 1905 he made a memorable address at the commencement exercises at Johns Hopkins University in which he referred to the chloroform scheme proposed in Anthony Trollope's novel, "The Fixed Period," which suggests a college into which, when the age of sixty was reached, men retired for a year of contemplation before the administration of chloroform, and suggested that the benefits of such an arrangement are apparent to any one who, like himself, is nearing the prescribed limit. His publications include "Principles and



WILLIAM OSLER.

Practice of Medicine," "Monograph on Cancer of the Stomach," "Cerebral Palsies of Children," and "Lectures on Abdominal Tumors." He died Dec. 29, 1919.

OSLO, Norway. See **Christiania.**

OSMAN (ŏs-män′), **Nubar Pasha,** Turkish general, born in Tokat, Asiatic Turkey, in 1832; died Feb. 4, 1900. He studied in Constantinople, entered the cavalry in 1854, and rendered efficient service in suppressing rebellions in Syria, Crete, and the Yemca. In 1876 he was made commander of an army in the Turko-Servian War, and for remarkable bravery at Saitschar was promoted to the rank of field marshal. In the war with Russia, in 1877, he commanded the Turkish forces at Plevna, where he repulsed attacks in July and September, and in December of the same year made a gallant attempt to escape from the besieged fort with 40,000 men, but was wounded and compelled to surrender. His skill at this notable siege gave him a wide reputation as a commander and engineer, and in 1878 he became commander in chief of the imperial guard. Subsequently he held the offices of governor general of Crete, minister of war, grand marshal of the palace, and several others of note in the Turkish Empire.

OSMIUM (ŏz′mĭ-ŭm), a metal associated in nature with platinum, so named because of the acrid odor of its oxide. It is obtained in thin flexible plates and when pure has a bluish-white color and a specific gravity of about 22. Various processes are employed for separating it from the elements with which it is alloyed, which include ruthenium, rhodium, and palladium. It is difficult to fuse osmium with other metals. The acid obtained from it is used to convert alcohol into acetic acid, to remove carbon from indigo, and as an oxidizer. See **Chemistry.**

OSMOSIS (ŏz-mō′sĭs), the tendency of liquids to mix or become equably diffused when in contact. It is a form of molecular attraction, allied to that of adhesion, and was first observed between fluids of different density. When the flow is from a thinner to a thicker fluid, it takes place more rapidly and is called *endosmose,* and the slower current from the thicker to the thinner fluid is known as *exosmose.* Osmosis ceases between two liquids when they become of the same density. It is an essential function in the economy of plant and animal life and takes place largely through a thin membrane. It is probable that nutritious fluids circulate by this means in plants. The interchange due to osmosis is employed to a considerable extent in the medical profession, especially to the treatment of tender parts within the body.

OSNABRÜCK (ŏs-nä-brük′), a city of Germany, in the province of Hanover, thirty miles northeast of Münster. It is on the Hase River, at the junction of several railways, and is surrounded by a fertile farming and fruit-growing country. The streets are regularly platted and well improved by paving. It has a fine Roman Catholic cathedral, the Protestant Church of Saint Mary, and a large and well-built public hall. The gymnasium was founded by Charlemagne. It has a theological seminary, two normal schools, and a fine public museum. The manufactures include wire and nails, pianos and organs, cotton and woolen goods, tobacco and cigars, earthenware, and machinery. Large stone quarries and coal mines are worked in the vicinity. The city was a member of the Hanseatic League. Population, 1920, 65,956.

OSPREY (ŏs′prā). See **Fishhawk.**

OSSIAN (ŏsh′ăn), an early warrior poet of the Gaelic Celts, son of Fionn, or Finn, MacCumhaill. He flourished in the 3d century A. D. The best information secured in regard to this personage came in 1760-63, when James Macpherson, a schoolmaster, published several productions of an epic nature, entitled "Temora" and "Fingal." These publications were widely read and increased the interest in the traditional and heroic literature of the Gaels, though such writers as Johnson pronounced them fabrications and asserted that they were in most part the work of Macpherson. However, these writings brought to notice the adventures of Fionn MacCumhaill, which form the basis of the literature of the Fenians, and constitute a large part of the interesting writings of the early Scotch and Irish peoples.

OSSINING (ŏs′sĭn-ĭng), a village of New York, in Westchester County, thirty miles north of New York City. It is on the Hudson River and the New York Central Railway and is located on a beautiful site that overlooks the wide expanse of the Hudson known as Tappan Bay. Near the village is the famous Sing Sing State prison. The Croton Aqueduct, seventy feet above water, is an interesting feature at this place. Many fine residences and yards beautify the village. It has manufactures of boots and shoes, medicines, machinery, and clothing. Waterworks, electric lighting, and sewerage are among the public improvements. It was named Sing Sing from the Sin Sincks Indians, but the name was changed to Ossining in 1901. It was incorporated in 1813. Population, 1905, 7,135; in 1920, 10,739.

OSSOLI (ŏs′sō-lē), **Marchioness.** See **Fuller, Sarah Margaret.**

OSTEND (ŏst-ĕnd′), a seaport city of Belgium, on the North Sea, in West Flanders, connected with other cities by a number of railroads and steamboat lines. It is 68 miles northwest of Brussels, in a fertile agricultural country, and has a large trade in dairy products, oysters, codfish, herring, poultry, and merchandise. Among the manufactures are cotton and woolen goods, sugar, clothing, tobacco, salt, candles, boots and shoes, chemicals, and machinery. The city has several fine parks, electric street railways, and many villas and hotels for the entertainment of tourists. Many thou-

sands of visitors flock to the place between May and November. It was founded in the 9th century, was besieged by the Spaniards in 1601, and capitulated to the French in 1745. It was occupied by the Germans in 1914 and was severely bombarded by the allies in 1917 and 1918. Population, 1922, 43,120.

OSTEND MANIFESTO, a declaration drawn up at Ostend, Belgium, on Oct. 9, 1854, by representatives of France, Spain, Great Britain, and the United States. They feared that the filibustering expeditions against Cuba would finally result in that island becoming Africanized like San Domingo, which induced these countries to favor a sale of Cuba to the United States. The manifesto declared that such a sale would be advantageous to both governments, but that, in case Spain refused to sell, the United States should acquire and annex the island by force of arms. This action was due largely to the interests of those who advocated slavery in the United States and was not approved in the platforms of either political party. The people of Europe generally condemned it.

OSTEOPATHY (ŏs-tē-ŏp'ă-thy), an art or science of treating diseases, so termed from *osteon*=bone, and *pathos*=suffering. It is based upon the theory that the body contains within itself the elements requisite to cure all infirmities and that all diseases are due mainly to a displacement of some bone, which, owing to its dislodgment, causes obstruction to the flow of one or more of the fluids of the body. The mode of treatment practiced by osteopaths consists chiefly in the adjustment of all parts and organs to their natural relations, which is done by pressing, rubbing, and otherwise manually treating the affected parts. The mechanical stimulation given is designed to induce more vigorous action in the organs, thereby aiming to incite greater energy. Orificial surgery was introduced by Dr. E. R. Pratt in 1895. In this branch of healing it is particularly necessary that the practitioner be skilled in detecting the affected parts, as well as in determining the kind and amount of exercise to be applied to the different organs needing special treatment. A. T. Still, a physician of Kirksville, Mo., is the founder of the science, which may be said to date from 1894. Many schools and periodicals devoted to osteopathy are maintained in Canada and the United States. In 1928 there were not less than 8,500 practitioners in the United States. The practice is recognized and regulated by law in many states and countries.

OSTIA (ŏs'tĭ-ă), an ancient city of Latinum, at the mouth of the Tiber, fifteen miles from Rome. It was founded by Ancus Marcius, who established salt works in the district. Later it became important as a port and naval station. During the civil war between Sulla and Marius, in 87 B. C., it was captured and plundered by the latter, but it soon recovered its former importance. The silt deposited by the Tiber gradually filled up its harbor and Emperor Claudius located a new harbor two miles west of the city, known as *Portis Augusti.* This harbor was enlarged by Trajan, but it was unprotected by walls and declined during the later years of the empire. Extensive ruins of Ostia still exist, but they are uninteresting and about three miles from the sea, owing to land having been formed by the alluvial deposits of the Tiber.

OSTRACISM (ŏs'tră-sĭz'm), a system of banishment practiced in Athens during the time of the republic, instituted to rid the state for a limited period of any person deemed dangerous to the government. Aristotle, in writing of this system, explained the subject as follows: "Democratical states used to ostracize, and remove from the city for a definite time, those who appeared to be preëminent above their fellow citizens, by reason of their wealth, the number of their friends, or any other means of influence." At first the banishment was for ten years, but it was subsequently reduced to five. It required 6,000 votes to banish a person, and, when that number or more votes were cast against any one person, he withdrew from the city within ten days. This sentence was pronounced against many distinguished men, including Alcibiades, Aristides, Cimon, and Themistocles. It went out of use about 416 B. C.

OSTRICH (ŏs'trĭch), a genus of cursorial birds, of which it is the type. They are native to the deserts of Africa and Arabia, and somewhat resemble the rhea, emu, and cassowary. The ostrich is the largest of living birds, standing from six to eight feet high, and has been known from remote antiquity. Xenophon and other ancient writers mention it, and it is frequently referred to in the literature of later Rome. Among its characteristics are that it has only two toes, which correspond to the third and fourth of other birds, a long, naked neck, small wings of little service in flight, and long and powerful legs, giving it great speed. Ostriches are usually seen in flocks following antelopes, zebras, camels, and giraffes. Their principal means of safety against enemies is their remarkable speed, being able to exceed the fleetest horse. The plumage of the male is black, with white plumes at the ends of the wings and tail, and is much esteemed for ornamental purposes. In some places it is reared and domesticated on large ostrich farms, a good bird yielding annually from twenty to forty plumes. The hen is colored somewhat differently than the cock, being more grayish and flecked, and as a whole its feathers are not so valuable. Ostrich feathers are prized principally for dress decoration, the back feathers being the most valuable, and those of the tail and wings taking the next rank. White plumes possess the greatest market value, the black being obtained by dyeing those partially colored by nature

and the price ranges from $75 to $200 per pound. Choice plumes frequently sell at $50 each.

Ostriches are hunted on horseback, or by the hunter putting on an ostrich skin to enable him to come within shooting range. They very infrequently give any sound and when they do it is somewhat like a cackle, but sometimes their cry is heard at a great distance, especially while in distress or when lost from their companions. The nest is made in the sand, where they lay the eggs, usually from eight to fifteen in the same nest, but these are from several hens. Ostrich eggs weigh about three pounds and hatch in six weeks. They are incubated by the hen and cock alternating, the cock usually occupying the nest at night, though in desert regions the sun has an assisting influence.

The ostrich is a vegetable feeder, but, like domestic fowls, swallows stones and other hard substances to aid the gizzard in its functions.

RHEA. OSTRICH.

Ostrich farming is carried on mainly in South Africa, North Africa, California, and Australia. The industry is altogether for the feathers, since the flesh is rarely eaten, though that of the young is quite palatable. An average-sized ostrich stands seven or eight feet high and weighs about 100 pounds; the extreme weight is 300 pounds. In walking the stride is about two feet; in running, about twelve feet.

OSTROGOTHS (ŏs'trŏ-gŏths). See **Goths.**

OSWALD (ŏs'wält), **Saint,** King of Northumbria, born about 604; died Aug. 5, 642. He was the son of King Ethelfrid and on the death of his father, in 617, was compelled to take refuge among the northern Celts, where he embraced Christianity. He was elected to the throne in 635. His efforts were devoted largely to the spread of Christianity among his subjects, who included Picts, Britains, Scotch, and Angles. His death occurred in battle against King Penda of Mercia. He was canonized by the Church of Rome.

OSWEGO (ŏs-wē'gō), a city and port of entry of New York, county seat of Oswego County, on Lake Ontario, 35 miles northwest of Syracuse, at the mouth of the Oswego River. It is on the New York Central, the Delaware, Lackawanna and Western, and other railroads. It has municipally owned waterworks, stone and asphalt pavements, and a system of electric street railways. The manufacturing enterprises are facilitated by water power derived from the Oswego River. Among the manufactures are cotton and woolen goods, starch, oil, matches, boilers, hardware, engines, knit goods, and edged tools. The noteworthy buildings include the county courthouse, the high school, the city hall, and the Federal building. It is the seat of a State normal school, the State armory, and the Gerritt Smith Library. The harbor is well protected by a breakwater and a lighthouse. Extensive jetties are at the mouth of the river. Settlements were first made in the vicinity of Oswego in 1720. It was captured by the French in 1756 and in 1812 by the British. In 1848 it was chartered as a city. Population, 1905, 22,572; in 1925, 22,369.

OTHMAN (ŏth-măn'), or **Osman I.,** noted Turk, born in Bithynia in 1259; died in 1326. He was the son of Orthogrul, a chief of Oguzian Turks, and was chosen successor to his father in 1829. In 1299 he succeeded in securing a part of Bithynia as an addition to his dominion, and soon after added Nicaea to his territory by obtaining a victory at the passes of Olympus. Othman was an ambitious ruler and proceeded to extend the power of the Turkish tribes in a wise and politic manner. His victories and organization of civic institutions formed the basis for the development of the present Turkish Empire. From him the terms Ottomans, Osmanli, and Othmans originated. It is not certain whether he assumed the title of Sultan, but writers credit him with coining money and with holding a court at Kara-Hissar.

OTHO I., called **Otto the Great,** Emperor of Germany, and founder of the Holy Roman Empire, son of Henry I., born in 912; died at Memleben, Thuringia, May 7, 973. In 936 he succeeded his father and was crowned emperor at Aix-la-Chapelle. Soon after he centralized his influence by annexing Bavaria, Swabia, Lorraine, and other regions to his dominion. He

became King of Lombardy in 951 and ten years later was crowned King of Italy. This is the beginning of the Holy Roman Empire, which he named officially, *Heiliges römisches Reich deutscher Nation.* Shortly after he pledged support to Pope John XII., but afterward declared war against him and placed Leo VIII. in his place on the papal throne. This course he justified on the ground that the Pope had become addicted to immoral practices. Later he defeated an army of Greeks in Lower Italy and thus added still other possessions. It was during the reign of Otho that Christianity was extended to the Scandinavian countries.

OTHO II., Holy Roman Emperor, born in 956; died Dec. 7, 983. He was a son of Otho I. and served as King of Rome during the lifetime of his father, whom he succeeded as emperor in 973. His dominion was invaded by Lothaire of France in 978, but he repelled the invaders and marched inland to Paris. The following year he suppressed a civil war in Italy, where he spent the greater part of his life. In 982 he was defeated by the Greeks and Saracens, who had invaded Italy from Sicily. Though he formed many great projects, he was too hasty in attempting their execution.

OTHO III., Holy Roman emperor, born in 980; died Jan. 21, 1002. He succeeded his father, Otho II., when but three years of age under the regency of his mother. His reign was disturbed by many wars. Henry of Bavaria attempted to gain the throne for himself, but was defeated and compelled to retreat. Lothaire, King of France, invaded Lorraine in 984, but was compelled to abandon the province. Otho took the government in his own hands in 996 and in the same year became involved in a civil war with Crescentius, whom he captured and put to death. He elevated his tutor, Gerbert, to the Papacy as Sylvester II. The male branch of the Saxon line disappeared at his death and he was succeeded by Henry II.

OTHO (ō'thō), **Marcus Salvius,** Emperor of Rome, born in 32; died in 69 A. D. He was the son of Lucius Otho, who held many high offices under Tiberius. In 68 he aided Galba in the rebellion against Nero, but was disappointed in not being named the successor of Galba. In a short time he conspired among the guards, who proclaimed him emperor and put Galba to death. However, the legions in Germany proclaimed General Vitellius emperor. Otho marched against him with a large army, but was defeated in a great battle on the Po River. He suicided by falling upon his sword, having reigned less than 100 days.

OTIS (ō'tĭs), **Elwell Stephen,** soldier, born in Frederick City, Md., March 25, 1838. After graduating at Rochester University, New York, in 1858, he was admitted to practice law in New York, but in 1862 entered the United States army, remaining with the 140th New York regiment to the close of the war. He was brevetted colonel for services at Spottsylvania, became brigadier general for gallantry at Chapel Hill, and rendered efficient aid in the Battle of Gettysburg. Later he took part in the Battle of the Wilderness and at Petersburg and Weldon Road, and was mustered out of the service in 1865 as brigadier general. The following year he received an appointment as lieutenant colonel of the regular army, served against the Indians from 1867 to 1881, and in the latter year organized the military school at Leavenworth, Kan. He became commander of the department of the Columbia in 1893, was transferred to the department of Colorado in 1897, and in 1898 was ordered to the Philippines, serving the following year as a member of the Philippine commission. On Feb. 4, 1899, the Filipino insurrection began and Otis commanded the American forces throughout the year. In 1902 he retired from the service. He ranks as a man of excellent judicial ability and a strict disciplinarian. In 1878 he published "The Indian Question." He died Oct. 21, 1909.

OTIS, Harrison Gray, statesman, born in Boston, Mass., Oct., 1765; died there Oct. 28, 1848. His general education was secured at Harvard University and, after studying law, he was admitted to the bar in 1786. In 1796 he became a member of the State Legislature and served in Congress as a Federalist from 1797 to 1801. From 1803 until 1805 he was speaker of the Massachusetts Legislature, served for a long term of years in the State senate, and was United States Senator from 1817 to 1822. Otis ranks as a popular public debater, was an able advocate of the antislavery cause, and became distinguished in debating the restriction of slavery in Missouri when that question was before the United States Senate in 1820. He was elected mayor of Boston in 1829 and three years later retired from public life.

OTIS, James, patriot and orator, born in West Barnstable, Mass., Feb. 5, 1725; died in Andover, Mass., May 23, 1783. He graduated at Harvard University in 1743 and was admitted to the bar in 1748, but soon after settled at Boston, where he acquired a reputation as an able advocate. He was advocate general at the time the British government adopted a coercive policy with the writs of assistance, in 1761, and this he not only opposed in a celebrated speech of five hours, but resigned his office in order to advocate the people's cause. Subsequently he was a member of the Massachusetts Legislature and in 1764 published a pamphlet entitled "Rights of the Colonies Vindicated." His influence was thrown in favor of appointing the stamp act congress, of which he became a member, and in that capacity delivered a number of able speeches against the policy of Great Britain. He assisted in preparing the address sent to the British House of Commons. His influence in favor of equality before the law and in legislation was in every case thrown in favor of

THE GOVERNMENT BUILDINGS AT OTTAWA

Crowning the summit of a great bluff that rises 160 feet above the Ottawa River are the stately Government Buildings of the Canadian Federation They are three in number. Nearest the river is the Parliament Building, and flanking it on the east and south are the structures used for depart mental offices. When the three buildings are viewed from the bridge that crosses the Rideau Canal close by, the group blends into a harmonious whole presenting the appearance of a single immense edifice.

(Opp 2065)

the colonists. The adherents of the British became so bitterly opposed to him that a number of their officers, in 1769, beat him severely, on account of which he lost his reason. His death resulted from a stroke of lightning. Otis ranks as one of the eloquent orators of the period preceding the Revolution.

OTO (ō'tō), a small tribe of Sioux Indians, formerly resident in the region of Nebraska which lies south of the Platte and west of the Missouri. They were united with the Missouris and now reside on a reservation in the eastern part of Oklahoma.

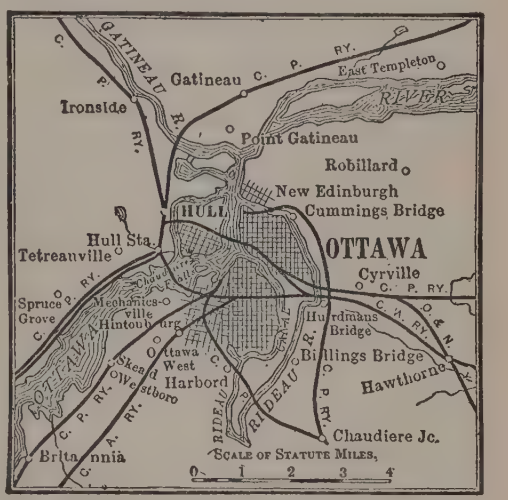
OTRANTO (ō-trän'tō), **Strait of,** a passage of water in the Mediterranean, uniting the Ionian Sea with the Adriatic Sea. It is about forty miles wide and separates the Italian from the Balkan Peninsula.

OTTAWA (ŏt'tà-wą), a city in Illinois, county seat of Lasalle County, at the junction of the Fox and Illinois rivers, 84 miles southwest of Chicago. It is on the Illinois Traction Interurban, the Chicago, Burlington and Quincy and the Chicago, Rock Island and Pacific railroads. The surrounding country is a fertile farming and dairying district. Among the principal buildings are the county courthouse, the Reddick Library, the high school, the Ryburn Memorial Hospital, the Pleasant View College (Lutheran), and the Saint Francis Xavier Academy. The manufactures include glass, pianos, packed meat, tile, cigars, brick, clothing, lumber products, and machinery. Among the municipal facilities are electric street railways, brick and cement pavements, and waterworks. The city water is drawn from artesian wells in the vicinity and nearby are marble quarries and coal mines. It was settled in 1830 and incorporated in 1853. Population, 1900, 10,588; in 1920, 10,816.

OTTAWA, a city in Kansas, county seat of Franklin County, 54 miles southwest of Kansas City, on the Marias des Cygnes River. It is on the Missouri Pacific and the Atchison, Topeka and Santa Fé railroads. The place is surrounded by a fertile farming and dairying country. The manufactures include ironware, flour, castor oil, sorghum, soap, dairy products, furniture, and machinery. Among the noteworthy buildings are the county courthouse, the high school, the First Methodist Church, the First Baptist Church, and the Municipal Auditorium. It is the seat of Ottawa University, a Baptist institution of higher learning. Ottawa was founded by John T. Jones, a missionary, and was chartered as a city in 1867. Population, 1905, 7,743; in 1925, 8,498.

OTTAWA, the capital of the Dominion of Canada, in the Province of Ontario, at the junction of the Ottawa and Rideau rivers. It is located in Carleton County, of which it is the capital, and is 100 miles west of Montreal. Communication is maintained by the Canadian Pacific, the Ottawa and New York, the Canada National, and other railways, and by steamer on the Ottawa River and the Rideau Canal, giving it direct connection with Montreal and the cities on the Great Lakes. Chaudière Falls, the fine cataract of the Ottawa, is at the west end of the city. Rideau Falls, divided by Green Island, are two cataracts at the place where the Rideau discharges into the Ottawa. These falls supply an immense water power for industrial use. Hull, in the Province of Quebec, is located across the river and is reached by several railway and road bridges.

The streets are wide, regularly platted, and substantially paved. On Parliament Hill are the capitol buildings of the Dominion, constructed of sandstone at a cost of $4,500,000. They cover nearly four acres and are constructed in the



Italian-Gothic style of architecture. The post office, the city hall, the residence of the Governor General, and the county courthouse are other public structures of note. The Christ Church Cathedral, the Roman Catholic Cathedral of Notra Dame, and many other ecclesiastical buildings are within the city. It is the seat of the Ottawa Ladies' College, the Ottawa Roman Catholic University, several normal schools, the hotel Chateau Laurier, and many benevolent institutions. About 210,000 volumes are contained in the Parliamentary Library. The city has an extensive museum and a valuable art gallery. Victoria Tower, a fine memorial to Queen Victoria, is 180 feet high. The city has several fine public grounds, such as Rockcliffe Park and Cartier Square, and the scenery surrounding the city is among the finest in Canada.

Ottawa has extensive manufactures of flour and lumber, both of which are exported in large quantities. Other products include brick, clothing, cigars, ironware, machinery, and farming implements. An extensive system of electric railways furnish communication to all parts of

the city and many interurban districts. Electric and gas lighting, waterworks, telephone communication, and sewerage are among the public improvements. Ottawa is the seat of the Anglican Bishop of Ontario, the Roman Catholic Archbishop of Ottawa, and a number of foreign consulates. It was founded by Colonel By and named Bytown in 1827, but was incorporated under its present name in 1854. Queen Victoria selected it as the capital of Canada in 1868. Population, 1901, 57,640; in 1921, 107,843.

OTTAWA, a river of Canada, the principal tributary of the Saint Lawrence. It rises 160 miles north of Ottawa, on the Laurentian divide, and after a tortuous course toward the west enters Temiscamingue Lake. After passing through the lake, it flows toward the southeast and joins the Saint Lawrence by two mouths, by which the island of Montreal is formed. It has a total length of 625 miles and drains a basin of 70,000 square miles. Among the tributaries are the Rideau, Madawasca, and Rivière du Lièvre. In its course are several rapids and falls, including the Carillân Falls, above Rigaud; the Chaudière Falls, near the city of Ottawa; and Les Chots Falls, about thirty miles above the latter city. The course is through a valuable lumbering country and vast improvements have been made by canals to facilitate lumbering. It is connected by the Rideau Canal at Kingston with Lake Ontario.

OTTAWAS, an American Indian tribe of the Algonquin family. They were originally resident in the northern part of Michigan, where they were first met by French explorers. The Ottawas were friendly to the French, whom they aided in the wars against the English, and in the Revolutionary War they assisted the latter. Treaties were made with them in 1785 and 1789, but afterward a war broke out between them and the Miamis, which was concluded by another treaty in 1795. Soon after they ceded their land around Lake Michigan to the United States and a reservation was provided for a part of them on the Miami River, whence a number removed in 1836. A part of the tribe settled in Missouri, others in Indian Territory, and some are still found in the region north of Lake Superior. The Ottawas counted among their chiefs the celebrated Pontiac. Within late years a number of Indians who are advanced in educational arts have traced their lineage back to him and other warriors famous in the early history of America.

OTTENDORFER (ŏt'ẹn-dŏrf-ẽr), **Oswald,** journalist and philanthropist, born in Zwittau, Austria, Feb. 26, 1826; died Dec. 15, 1900. He studied at the universities of Prague and Vienna, came to the United States in 1871, and soon after began the publication of the *New Yorker Staats-Zeitung* in New York City. At first he was the editor and later became its proprietor. This periodical developed a marked influence in the political affairs of New York City and State, and attained a wide circulation among the German citizens of the different states. Ottendorfer subsequently became president of the German Reform Association, and served as alderman of New York City from 1872 until 1874. Among his philanthropic enterprises is the establishment of an educational institution in Zwittau, for which purpose he gave $300,000. He founded a home for aged and indigent men and gave $50,000 to establish the Ottendorfer Library in New York City.

OTTER (ŏt'tẽr), a class of carnivorous mammals of the weasel family. These animals include about twenty species that vary greatly in size. The *common otter* measures a little over two feet from the nose to the tail, which is relatively short. It has soft fur of a brownish color, webbed feet adapted for swimming, and a weight of about twenty pounds. Otters are found along the shores of streams and lakes, where they construct holes and channels through the ground, and subsist by feeding on fish, small birds, frogs, and other aquatic animals. In most species the fur consists of long, coarse, and shining hairs, with a short under fur of fine texture. The *great sea otter* inhabits the coast regions of the North Pacific Ocean, weighs from fifty to seventy pounds, and bears a very beautiful and valuable fur. This species and most others are destructive to fish, particularly to salmon, and have been hunted until they are of rather rare occurrence in the regions of America that were formerly inhabited by them. The *Canadian* or *American otter* for-

SEA OTTER.

merly was plentiful throughout central Canada, but is now rare in the southern section. It has a valuable fur, which is dark brown in winter and reddish brown in summer.

OTTERBURN (ŏt'tĕr-bûrn), **Battle of,** a contest that occurred near the village of Otterburn, in Northumberland, in August, 1388, between the Scotch under Earl Douglas and the English under Harry Percy. It is important from a historical standpoint for the reason that the "Chevy Chase," perhaps the most famous of English ballads, and the "Scotch Ballad of Otterburn," are based upon this event, though the former ballad apparently does not date earlier than the beginning of the 17th century. It appears that Douglas, clad in armor, with his Scottish spears bravely led his countrymen against the assault under Percy, and after a most valorous fight was struck to the heart by an English arrow, but Sir Hugh Montgomery immediately dashed forward and struck his spear through the heart of Percy. The contest raged until the ringing of the curfew bell and both sides claimed the victory. That both fought with remarkable valor was attested by the many nobles who lay bleeding on either side of the line of battle.

OTTO I., King of Greece, born at Salzburg, Germany, June 1, 1815; died July 26, 1867. He was a son of Louis I., King of Bavaria, and was elected to the throne of Greece by the national assembly in 1832. The first three years he reigned under a regency, but assumed full power in 1835. A monetary crisis caused a revolution in 1843, when the king was compelled to agree to a constitution. In 1862 an insurrection took place and he fled to Salamis, where he issued a proclamation that he quitted that country to avoid civil war, but did not renounce his claim to the throne. His difficulties were due largely to the Crimean War, during which the sympathies of Greece were in favor of Russia, which placed him in a very critical position.

OTTOMAN EMPIRE. See **Turkey.**

OTTUMWA (ŏt-tŭm'wà), a city in Iowa, county seat of Wapellŏ County, on the Des Moines River, 87 miles southeast of Dés Moines. Communication is by direct lines of the Wabash, the Chicago, Rock Island and Pacific, the Chicago, Burlington and Quincy, and the Chicago, Milwaukee and Saint Paul railroads. It is surrounded by a highly productive agricultural and dairying country, which contains valuable deposits of coal and clays. Electric street railways, sanitary sewerage, and brick and asphalt pavements are among the public utilities. The noteworthy buildings include the county courthouse, the Federal building, the public library, the high school, the Y. M. C. A. building, and the Union passenger station. Among the manufactures are linseed oil, starch, tobacco products, flour, cutlery, ironware, boilers, stoves, and packed meats. The manufacturing enterprises are facilitated by excellent water power. It has a growing trade in merchandise, cereals, coal, and live stock. Ottumwa was settled in 1849 and incorporated in 1851. Population, 1905, 20,181; in 1925, 26,375.

OUDENARDE (ou'dęn-är-dę), or **Oudenaarde,** a town of Belgium, in the province of East Flanders, on the Scheldt River, 36 miles west of Brussels. It has good railroad connections with other cities of the Netherlands, a fine Gothic council house, and manufactures of leather, cotton and woolen goods, and machinery. Oudenarde is important mainly because of several historic battles, among them the battle of 1674, when William of Orange conducted a long siege against the French. It was the scene of the celebrated victory of Marlborough over a French army under the Duke of Burgundy on July 11, 1708. Population, 1922, 8,146.

OUDH (oud), or **Oude,** an extensive region of British India, located south of the Himalayas, southwest of Nepal, and west of Bengal. The area is 24,217 square miles. For administrative purposes it is connected with the United Provinces of Agra. The surface is an alluvial plain, which is drained by the Gogra, the Gumti, and other tributaries of the Ganges. Agriculture in the principal industry and much of the surface can be cropped twice during the year. Rice, millet, wheat, rye, barley, tobacco, opium, and indigo are the chief crops. Cattle and buffaloes are reared extensively, being used as beasts of burden. Manufactured products are imported extensively, but opium, wheat, and tobacco are exported.

Oudh is more densely populated than any other portion of India. A large part of the inhabitants are Hindus, only about one-seventh being Mohammedans. It was a center of civilization in ancient times and was conquered by an army of Mohammedans in 1195. For several centuries it was a province in the Mogul Empire. In 1857 it was foremost in the Sepoy Mutiny, having been annexed by the East India Company the year previous. Lucknow is the capital and largest city. Population, 1922, 13,035,172.

OUDINOT (o͞o-dē-nō'), **Charles Nicolas,** Duke of Reggio and Marshal of France, born at Bar-sur-Ornain, France, April 26, 1767; died in Paris, Sept. 13, 1847. He secured an early military training, entered the army in 1784, and in 1787 was given the rank of sergeant. In 1794 he was promoted general of brigade for gallant service on the frontier of Belgium and in 1805 was awarded the cross of the Legion of Honor by Napoleon, who had made him commander of a grenadier corps of 10,000 men. With this force of men he distinguished himself at Austerlitz, Jena, and Ostrolenka, winning the last named battle on Feb. 18, 1807. Napoleon made him Duke of Reggio and Marshal of France for winning the Battle at Wagram and settled upon him an estate valued at $20,000 per year. He accompanied the army on the disastrous cam-

paign into Russia and in 1813 fought against the allied forces of Austria and Russia at Dennewitz and Grossbeeren. When Napoleon abdicated, Oudinot went over to the Bourbons, and after that gave them his undivided support. Louis XVIII. made him a peer after the second restoration. Subsequently he became minister of state, was decorated with the grand cross of Saint Louis, and commanded the army of invasion in Spain in 1823, but in 1830 retired to his estates. In 1850 a statue was erected to his memory at Bar.

OUNCE, a species of the cat which is native to Asia and North Africa. It somewhat resembles the leopard, but has a lower and longer body, a more hairy tail, and a darker color. The spots are less regular than in the leopard. It is found throughout Central Asia, especially in Tibet and China, and extends westward and southward beyond the Mediterranean. Although it rarely attacks man, it destroys sheep, goats, and other small domestic animals. The jaguar of South America is sometimes, but incorrectly, called ounce.

OUNCE, the twelfth part of a Troy pound, containing 480 grains. The avoirdupois pound contains 16 ounces and is equal to 437½ grains Troy.

OURO PRETO (ō'rŏŏ prā'tŏŏ), a city of Brazil, in the state of Minas Geraes, 165 miles north of Rio de Janeiro. It is located on the slope of a mountain range and is surrounded by a rich gold-mining region. A railway connects it with Rio de Janeiro and other cities. Formerly it was the capital of the state, but the seat of government was removed to Bello Horizonte, or Minas, in 1894. Population, 1922, 13,806.

OUSE (ōōz), a river of England, in Yorkshire, formed by the confluence of the Ure and the Swale rivers. The length is 130 miles. It joins the Trent to form the Humber and is navigable from York to this junction, a distance of 45 miles.

OUSE, Great, a river of England, which rises in Bedfordshire, near Brackley, and flows into the Wash at King's Lynn. It is 160 miles long and is navigable about half that distance, having been improved by dredging.

OUSELEY (ōōz'lĭ), **Sir Frederick Arthur Gore,** composer, born in London, England, Aug. 12, 1825; died April 6, 1889. He was the son of Sir Gore Ouseley, a capitalist, graduated at Oxford, and in 1855 became a professor of music at that institution. He attained remarkable success both as teacher of music and as composer, and gave his whole fortune as an endowment to Saint Michael College in Tenbury, an institution for the training of choristers. His publications include "Treatise on Counterpoint and Fugue," "Treatise on Harmony," and "Treatise on Musical Forms." He edited Naumann's "History of Music." His oratorios include "Hagar" and "Saint Polycarp."

OUTRAM (ōō'trąm), **Sir James,** soldier and statesman, born in Derbyshire, England, Jan. 29, 1803; died in Paris, France, March 11, 1863. He studied at the Udny School, entered Marischal College, Aberdeen, in 1818, and the following year received a cadetship. In 1819 he went to India, where he won military distinction, and in 1825 was sent on a military mission to Khandesh, where he trained a light infantry corps. He became adjutant to Lord Keane, whom he accompanied in the Afghan War of 1839. After the capture of Khelat, he disguised himself as an Afghan merchant and rode for 335 days through Afghanistan for the purpose of studying the region. He became chief commissioner of Oudh in 1856 and commanded the English army in Persia, whence he was called in 1857 to aid in suppressing a mutiny in India. After landing at Bombay, he received instructions from Lord Canning at Calcutta, and was dispatched to relieve Lucknow. For eminent services he received the thanks of Parliament, was made a baronet, and was promoted to the rank of lieutenant general. In 1860 he became a member of the supreme council in India, but soon after returned to England on account of impaired health, and took up his residence for medical treatment in France. Outram ranks as an efficient soldier and statesman. His remains were buried in Westminster Abbey and his memory is prolonged by statues in Calcutta and London.

OUZEL (ōō'z'l), or **Ousel,** the name of several birds native to Europe, most of which belong to the thrush family. The bill is slender and slightly bent upward, the wings are rounded, and the tail is very short. To this class of birds belongs the *water ouzel* of America, which is somewhat larger than the European species. See **Dipper.**

OVAMPO (ō-väm'pō), a native race of Africa, belonging to the Bantu people. This race occupies a region on the northern border of German Southwest Africa. In stature and features these people resemble the Kaffirs. They live in communities rather than villages and engage in raising corn, fruits, and cattle. The men shave their heads, wear sandals, and are fond of hunting. Beadwork, baskets, and various ornaments are made by the women. They are industrious, but are not highly advanced in the civilized arts of the Europeans.

OVENBIRD, the name of a group of birds found in South America and the West Indies. The common ovenbird is about six inches long, is reddish above and white below, and has a loud and shrill note. It runs rapidly or makes short flights when in search of insects. These birds nest in trees and houses, constructing their habitations of clay and twigs or straws, and are seen generally in pairs. They are so named from their habit of building oven-shaped nests. The *water thrush* of the United States is an allied species, and its nest is roofed over with

the entrance on one side. This bird is somewhat smaller, being about five inches long.

OVERBECK (ō'vĕr-bĕk), **Johann Friedrich,** famous painter, born at Lübeck, Germany, July 3, 1789; died Nov. 12, 1869. He studied art in Vienna and Rome and was for nearly sixty years one of the leading German painters. In 1811 he formed the idea of founding a school of art in Rome, in which enterprise he was joined by Philipp Veit, Wilhelm Schadow, and several others, and the institution exercised a large influence upon painting in Europe. His productions are noted for admirable composition, high excellence of coloring, and delicacy of finish. Many of his works have been engraved for use in various countries. He executed splendid frescoes in several houses and church edifices. His most famous pictures include "Influence of Religion on Art," "Christ's Agony in the Garden," "Incredulity of Saint Thomas," and "Christ's Entry into Jerusalem." Among his frescoes may be named "Miracle of Roses of Saint Francis" and productions illustrating the history of Joseph, among them "The Selling of Joseph" and "The Seven Lean Years." His death occurred in Rome.

OVERSHOT WHEEL. See **Wheel.**

OVID (ŏv'ĭd), **Publius Ovidus Naso,** celebrated Roman poet, born at Sulmo, March 20, 43 B. C.; died near the mouth of the Danube in 18 A. D. He received a careful education at Rome, where he also studied for the bar, and developed an early proficiency in oratory. After completing his education, he went to Athens to acquire a mastery of Greek and traveled in Sicily and Asia Minor. He belonged to the social class which was entitled to entrance into the senate, but he did not join that body, being prevented from aspiring to high dignity in political affairs by reason of his indolent habits and weakness of body, though he held several public positions of minor importance. Ovid possessed the essential genius of a poet, and his writings date from an early period in his life. He was much influenced by the Alexandrian poets and dealt largely with the mythical tales of the Greeks. His residence was at Rome until his fiftieth year, where he enjoyed the friendship of a large number of distinguished men.

Ovid was married three times before his thirtieth year and was the father of Perilla, for whom he manifested a tender fondness. His first two wives were divorced mainly because the restraint of marriage ties was distasteful to him, and before his third marriage he was associated on many occasions with the lady whom he celebrated as Corinna, but who was the accomplished daughter of Augustus, named Julia. An edict issued by Augustus in 9 A. D. required him to leave Rome and locate at Tomi, a town near the Danube delta, on the Black Sea. It is supposed that his banishment came about because of having published "The Art of Love," though most writers regard this as a mere pretext, since the poem appeared fully ten years before, and it is thought that the intrigues with Julia were the real occasion.

At Tomi his life was spent among a people whose language he did not at first understand, but he soon acquired a proficiency in it, and became popular there by reciting poems in honor of Augustus. However, he desired very much to return to Rome, for which purpose he and his friends addressed letters to the emperor without effect, causing him to remain there until his death. His writings were numerous and many of them have come down to us. The most important include a number of letters of heroines to their husbands or lovers, entitled "Epistolae Herodium;" love eulogies, entitled "Amorum Libri III.;" a poetical calendar, entitled "Fasti;" and many volumes of others, including "Metamorphoses," "Remedia Amoris," "Ars Amatoria," and "Tristia."

OWATONNA (ō-wȧ-tŏn'nȧ), a city in Minnesota, county seat of Steele County, on the Straight River, 68 miles south of Minneapolis. It is on the Chicago and Northwestern, the Chicago, Milwaukee and Saint Paul, and the Chicago, Rock Island and Pacific railroads. The surrounding country is fertile. The principal buildings include the county courthouse, the high school, the public library, the Pillsbury Academy, the Sacred Heart Academy, and the State school for dependent children. It has three parks, well-graded streets, and a system of sanitary sewerage. Among the manufactures are flour, earthenware, and machinery. The place was settled in 1853 and incorporated in 1863. Population, 1905, 5,651; in 1920, 7,252.

OWEGO (ō-wē'gō), a town of New York, county seat of Tioga County, twenty miles west of Binghamton. It is on the Susquehanna River and on the Erie, the Lehigh Valley, and the Delaware, Lackawanna and Western railroads. Owego is noted as a summer resort and residential center. The surrounding country is productive, having fine farms, orchards, and dairying interests. The county courthouse, the Coburn Free Library, and the Owego Academy are among the leading buildings. It has waterworks and electric lighting. Flour, clothing, wagons, steel bridges, and machinery are among the manufactures. Owego was an Indian village at the time of the Revolution. It was incorporated in 1827. Population, 1920, 4,147.

OWEN (ō'ĕn), **Sir Richard,** anatomist and zoölogist, born in Lancaster, England, July 20, 1804; died in London, Dec. 19. 1892. He studied in the Lancaster grammar school, took a course in medicine in Edinburgh and London, and in 1834 was appointed professor of comparative anatomy at Saint Bartholomew's Hospital, having previously served as an assistant curator in the Hunterian Museum. In 1836 he became professor of anatomy at the Royal College of Surgeons, and in 1856 was made superintendent

of the natural history department in the British Museum, where he took advantage of the excellent facilities offered there for studying living and extinct animals. Owen is classed among the most eminent students of anatomy and fossils since the time of Cuvier, whom he met at Paris. He maintained a friendly but conservative view in regard to the theory of modern evolutionists. The honors of knighthood were conferred upon him in 1879, and he was shown many distinctions by the leading scientific societies of America and Europe. His publications embrace a large number of valuable works, among them "Fossil Reptiles of South Africa," "Extinct Wingless Birds of New Zealand," "Fossil Mammals of Australia," "Lectures on the Comparative Anatomy of the Vertebrate Animals," "Extinct Marsupials of England," "History of British Fossil Reptiles," and" Memoir on the Pearly Nautilus."

OWEN, Robert, social reformer, born at Newtown, Wales, March 14, 1771; died Nov. 19, 1858. He became interested in the cotton mills at New Lanark, in Scotland, and succeeded in building up large industrial enterprises. In 1823 he founded a communist society at New Harmony, Ind., but this proved a failure and he returned to England. Later he conducted a labor office in London and in 1828 went to Mexico to promote his socialistic schemes. These having proved a failure, he returned to England to promote the socialistic theories among the laboring classes. He published a work entitled "Book of the New Moral World."

OWENSBORO (ō'ĕnz-bŭr-ō), a city of Kentucky, county seat of Daviess County, on the Ohio River, 115 miles southwest of Louisville. It is on the Illinois Central, the Louisville and Nashville, and other railroads and has regular communication by steamboats. The surrounding country produces large quantities of tobacco, cereals, lumber, and minerals. It has a large trade in tobacco, live stock, lumber, and merchandise. Among the manufactures are tobacco products, furniture, automobile accessories, bread, clay products, wagons, flour, ironware, canned goods, earthenware, and machinery. The noteworthy buildings include the public library, the city hall, the county courthouse, the Federal building, the high schools, the Saint Francis Academy, and many churches. It has Legion Park, electric street railways, systems of waterworks and sanitary sewerage, and brick and asphalt pavements. The place was settled in 1798, when it was known as Yellow Banks, and in 1818 was named after Colonel Abraham Owen. Population, 1920, 17,424.

OWEN SOUND, a city of Ontario, capital of Grey County, on Georgian Bay. It is at the mouth of the Sydenham River and on the Canadian National and the Canadian Pacific railways, about 120 miles northwest of Toronto, and is a port of entry. The chief buildings include the high school, the townhall, and the courthouse. Among the manufactures are machinery, leather, engines, and farming implements. It has electric lighting, waterworks, and a sewerage system. Population, 1901, 8,776; in 1921, 12,190.

OWL, a large group of birds of prey, including fully 150 species, about forty of which inhabit North America. They are distinguished chiefly on account of their nocturnal habits. The different species have a short head, a circular or triangular facial disc, large eyes and ears, the outer toe reversible, and, owing to the soft plumage, a noiseless flight. Most owls are nocturnal in habit, flying about at night in search of food, their full and prominent eyes with large pupils making it quite possible to move with safety at twilight or after night. The plumage is variously colored in the different species, but it is mostly brown and yellow, and is shaded with various spots or bars. It is remarkably downy. The species which subsist by catching fish have the toes and tarsi quite bare of feathers, but the others have feathers extending to the base of the claws. Mice constitute the favorite food of owls, but they also search for other small animals and insects. The hollows of trees, crevices of rocks, old buildings, and isolated caves are favorite haunts during the day, where they build their nests and rear their young.

Owls cast up the indigestible parts of the food swallowed in the form of pellets. These castings occur principally under their roosts. They show that these birds are of service to man in destroying rats and mice. If taken

BARN OWL. HORNED OWL.

young, most species may be tamed, particularly the familiar *barn owl.* When irritated, this species gives out a hissing sound while snapping its mandibles, and most species have a rather pleasant hoot. The species vary from five inches to two feet in length and occur in all parts of the habitable globe, but the barn owl has by far the greatest distribution. Among the more common species are the *brown owl,*

(Opp. 2070)

GREAT-HORNED OWL.

(One-fourth Natural Size.)

the *long-eared owl,* and the *eagle owl.* These species are widely distributed in America and Europe. The *snowy owl* is of common occurrence in the northern part of Europe, and the *short-eared owl* is of wide distribution in woody countries and in moorlands. The *screech owl* is noted for its discordant scream and is widely distributed, while the *Boobook owl* is a species common to Australasia. A class known as *burrowing owls* is common to America and the West Indies. It is peculiar on account of burrowing in the ground and for frequenting the burrows of the marmot, or prairie dog. The *snowy owl* and *hawk owl* are not nocturnal in their habits. The former has remarkably snowy plumage and large size and the latter is migratory, moving southward from Canada and the northern part of the United States early in autumn.

OWOSSO (ō-wŏs'sō), a city of Michigan, in Shiawassee County, on the Shiawassee River, 78 miles northwest of Detroit. It is on the Michigan Central and the Grand Trunk railroads. It is surrounded by a fertile agricultural and dairying country. Large quantities of sugar beets and other vegetables are grown in the vicinity. The features include the Federal post office, the high school, the public library, and many fine churches. Among the manufactures are ironware, bread, butter, coffins, clothing, lumber products, beet sugar, cigars, flour, and machinery. The place was settled in 1836 and incorporated in 1859. Population, 1920, 12,575.

OX, a bovine quadruped of the genus *Bos,* including the species known as the common ox, the buffalo of North America, the bison or yak of Asia, the zebu or Indian ox, the buffalo of Europe and Asia, and many others. The common ox has been known from remote antiquity. In India it still possesses a sacred character. It is one of the most useful animals to man, serving as a beast of burden and draught. The female yields milk of abundance and much richness. It is a prolific source of animal food, while its bones, skin, hair, hoofs, horns, and, in fact, all parts are of value for divers purposes. When the name is applied to the male, it has various significations. A male animal less than a year old is designated as *bull calf,* or *ox calf,* and after that as a *bull,* if not castrated. A castrated male is called a *steer.* See **Cattle.**

OXALIC ACID (ŏks-ăl'ĭk), an acid found in a number of plants, animals, and rarely in minerals. It was discovered by Scheele in 1776 in wood sorrel, to which it gives a very acid taste. In this and other plants it occurs combined with potash as binoxalate of potash. Combined with lime, it gives solidity to many lichens, and is found in the roots of rhubarb and other plants. It is obtained artificially by the oxidation of sugar or of starch by nitric acid. Oxalic acid is a corrosive poison. It is employed chiefly in calico printing, for whitening leather, and for removing stains of ink and iron rust from fabric. The compounds of oxalic acid with basis, such as binoxalate of potash, are known as *oxalates.*

OXALIS (ŏks'ă-lĭs), a genus of plants which are widely distributed in the continents, including about 200 species. They are generally known as wood sorrel and belong to the geranium family. Most of the species are native to the subtropical regions on both sides of the Equator, and a few are common to the temperate parts of Europe and America. They bear flowers with five petals and ten stamins and the leaves are compound. Many species are cultivated for their foliage and pretty flowers as greenhouse plants. A species common to Mexico has a root similar to that of the parsnip, for which it is cultivated.

OXENSTIERN (ŏks'ẹn-stērn), or **Oxenstjerna, Axel,** statesman, born at Fånö, Sweden, June 16, 1583; died Aug. 28, 1654. He studied at the German universities of Jena and Wittenberg and, on returning to Sweden, in 1602, he was employed by Charles IX. to conduct important diplomatic negotiations. In 1609 he was made a senator and two years later became chancellor of Sweden under Gustavus Adolphus. In this capacity he negotiated the Treaty of Knäröd with Denmark, in 1613. He accompanied the king on his campaign into Germany and, after the death of Gustavus Adolphus at Lützen, in 1632, he was empowered to continue the war. The congress of Heilbronn made him head of the Protestant League and as such he concluded an alliance with France and Holland. During the minority of Christina, daughter of Gustavus Adolphus, he was chief of the government. He protested against her determination to abdicate the crown and exercised a wise and protective influence during the critical period that preceded the Treaty of Westphalia, in 1648, which terminated the war.

OXFORD (ŏks'fērd), a city of Mississippi, county seat of Lafayette County, on the Illinois Central Railroad, thirty miles south of Holly Springs. The surrounding country produces cotton and fruits. It has canneries, machine shops, and industries connected with cotton. Oxford is the most important educational center in the State, being the seat of the University of Mississippi, and is a favorite point on the Jefferson Davis Highway. It has well-graded streets and a municipal system of waterworks. Population, 1920, 1,948.

OXFORD, a town of Ohio, in Butler County, 38 miles northwest of Cincinnati, on the Cincinnati, Indiana and Western Railroad. It is pleasantly situated in the Miami valley and is surrounded by a fertile agricultural country. Many well surfaced highways focus into this place. Oxford is a noted educational center, being the seat of Miami University, Oxford College, and Western College. It has systems of waterworks and sanitary sew-

erage. The streets are well improved by grading. Population, 1900, 2,009; in 1920, 2,146.

OXFORD, a city of England, county seat of Oxfordshire, noted principally as the seat of the celebrated University of Oxford. It is situated at the confluence of the Cherwell and Thames rivers, fifty miles northwest of London, with which it is connected by a number of important railways. The older part of the city is located on a rectangle formed by the two rivers, but the newer portions extend over the undulating region beyond. The surrounding country is fertile and productive, but the Thames has many branches and forms a number of marshes. High Street, the leading thoroughfare, is one of the finest streets in England. Among the principal buildings are those of the university and a number of structures of historic interest. These include the Clarendon Building, in which the Clarendon press was located until 1830; the Saint Michael's Church, dating from 1070; His Majesty's Prison, on the site of an old castle; the Church of Saint Michael, with a noted Saxon tower; and the Church of Saint Peter, in the eastern part of the city. It has a number of fine statues and monuments, including Martyr's Memorial, a cross erected in 1841 to commemorate Latimer, Ridley, and Cranmer.

Oxford has considerable trade and a number of manufacturing industries, but is supported more particularly because of its educational institutions. It has systems of waterworks and sanitary sewerage, stone and macadam pavements, and several hospitals and collections of art. The place was first mentioned as Oxnaford, probably having reference to a ford for oxen across the rivers. In 802 it contained several educational institutions and afterward became the residence of kings Alfred and Canute. William the Conqueror captured the city in 1068. In the reign of "Bloody Mary" occurred the execution of Latimer, Ridley, and Cranmer, and in the 17th century it was made the headquarters for a brief period by the Royalists. Population, 1921, 53,049.

OXFORD, University of, a celebrated institution of higher learning of England, in the city of Oxford, a Parliamentary borough and the county seat of Oxfordshire. Oxford and Cambridge universities constitute the two most important educational institutions of Great Britain, each of which embraces a number of colleges organized as distinct corporations, though all belong to the universities proper. Oxford University is constituted of 21 colleges and two halls, the oldest, University College, dating from 1253. However, some writers think that Merton College, founded in 1264, should be considered the oldest, since it was the first to adopt a collegiate system by giving instruction in halls.

The following is a complete list of the colleges: University College, established in 1253; Merton College, 1264, but not joined to Oxford until 1274; the mother of John Baliol, King of Scotland, founded Baliol College in 1268; King Edward II. founded Oriel College in 1326; Queen's College was founded in 1340; All Souls' College, in 1347; Queen Elizabeth founded Jesus College in 1571; and the others include Exeter College, New College, Lincoln College, Magdalen College, Corpus Christi College, Christ Church College, Brasenose College, Trinity College, Saint John College, Wadham College, Worcester College, Pembroke College, Keble College, and Hertford College. Besides these are two similar institutions known as Saint Edmond Hall and Saint Mary Hall, which differ in that they are not incorporated. With the University are affiliated three colleges for women, known as Margaret Hall, Summerville Hall, and Saint Hughes Hall. Since 1884 women are admitted to the examinations, but degrees are not issued to them. Other connected institutions embrace the Radcliffe Library, the Botanical Gardens, the Bodleian Library, the Taylor Institution of Modern Languages, the Ashmolean Museum, the University Museum, the Indian Institute, and the Observatory. Three other affiliated colleges organized since 1880 are the University College, at Nottingham; David's College, Lampeter; and Firth College, Sheffield. The university proper has about 50 professorships and is attended by about 3,500 students.

Oxford University may be attended by any one who is qualified to pass the examinations, there being no restriction as to creed, birth, or age. Instruction is given largely by tutors, but there are lectures at regular intervals by the professors. The head of the university is centered in the chancellor, who is usually chosen from the nobility. The position of chancellor may be considered honorary, since the judicial and executive authority is exercised almost exclusively by the vice chancellor, who is appointed by the chancellor. The hebdomadal council, the congregation of the university, and the house of convocation are the governing bodies. All the legislative proposals originate in the hebdomadal council, which is constituted of twenty elective or official members. The congregation of the university is constituted of professors and officials, and includes all members of the convocation resident in Oxford. In that body is vested the power to reject, amend, or confirm the proposals which originate in the hebdomadal council.

All the registered masters and doctors constitute the house of convocation. In this body is vested the power to elect two members to Parliament, transact the general business, and elect to office nearly all officials of the institution. Each college has rules of its own for the government of its students and classes, but all are subject to a general constitution. The courses are extensive and diversified, the degrees including bachelor and master of arts and bachelor

and doctor of civil law, medicine, divinity, and music. The students maintain many of the usual college societies, organize games, and support various clubs. Splendid grounds and gardens are maintained in connection with the university. The libraries are among the best of Great Britain.

OXUS, or **Amu,** a river of Central Asia, now generally called Amoo Darya or Jihoon. It rises in Lake Sar-i-Kol, in the plateau between the Hindu Kush and Thian Shan Mountains, and, after a general course of about 1,275 miles toward the northwest, flows into the Aral Sea. It has a number of important tributaries, including the Panja River, one of the headstreams, and at its mouth is an extensive marshy delta about ninety miles long. Before the Christian era the Oxus flowed into the Caspian Sea, a fact recently demonstrated by exploring its former bed, the change being due to the action of water on the alluvial soil. It is navigable for about 275 miles from the Aral Sea. Vast quantities of water are drawn from its upper course for irrigation purposes. The valley of the Oxus contains many remains of ancient peoples, and the region surrounding its source is regarded by some writers as the cradle of the human race.

OXYGEN (ŏks'ĭ-jĕn), the most abundant and important gaseous element yet discovered, which forms by weight about one-half of the mineral, four-fifths of the vegetable, and three-fourths of the animal kingdoms. By volume it constitutes one-fifth of the atmosphere and by weight eight-ninths of water. It has neither taste nor color and is odorless. It is a little heavier than air, its density being 1.1056, is almost insoluble in water, and is the most magnetic of all the gases, though it is the least refractive. Oxygen unites with all the elements, except fluorine and bromine, forming with some elements alkalies, with others acids, and with others neutral substances. When oxygen is so united the product is called an *oxide*. Oxides embrace the most important chemical compounds. Fire, artificial light, electricity, and electro-magnetism depend largely upon the presence of oxygen, and mechanical power derived from combustion depends upon oxidation. Animal life is dependent upon the inhalation of oxygen. With every inspiration of air this gas is carried to the lungs, whence it is passed to the different parts of the body by the blood, and in the tissues forms a union with the tissue elements. The blood deprived of its oxygen becomes the venous blood, which is returned to the lungs to be again mixed with oxygen and is sent anew into the system as the bright arterial blood. Oxygen was first discovered by Eck, a chemist of Sulzbach, Germany, in 1489, and was independently rediscovered by Priestley and Scheele in 1774. Lavoisier made experiments with it the following year and named it oxygen. It can be converted into a liquid state under the influence of great cold and high pressure.

OYAMA (ō-yä'mä), **Iwao, Marquis,** eminent soldier, born in the clan of Satsuma, Japan, in 1842. He studied military tactics under Saigo Nanshu and with him fought at the Battle of Fushimi, when the imperial forces contended for the restoration of the sovereign power. During the Franco-Prussian War he was a military attaché, receiving from this position an education quite valuable in his career as a soldier. In 1882 he was made minister of war, serving successfully for two years, when he was appointed chief of the general staff. He was commander of the second army in the Chinese-Japanese War of 1894, when he besieged and captured Port Arthur. However, his military reputation is based more particularly on the achievements of the Russo-Japanese War, in which he was the commander in chief of the Japanese army in Manchuria. He was in personal command of 200,000 men at the Battle of Liaoyang. At Mukden he directed the movement of the combined Japanese army of 450,000. This battle, one of the greatest in history, in which 860,000 men were engaged, resulted in the defeat of the Russians largely because of his superior generalship. He died Dec. 10, 1916.

OYSTER (ois'tẽr), an edible bivalve mollusk, closely allied to the mussels. It belongs to the family *Ostrea* and includes numerous extinct and extant species. Oysters are found near the shores of salt and brackish water, where they are moored by the left shell to stones or other hard substances. They feed principally on microscopic beings and particles of organic matter which they take in from the

INSIDE VIEW OF AN OYSTER.

currents of water by the mouth at the hinge end of the shell. Although the sexes are distinct, they have the same external appearance. The spawning season occurs from May to September, when they are not caught for food, each oyster producing several thousand eggs. However, sexual connection does not take place in the adults, but the eggs ooze from the genital openings of both male and female, when they

are ripe, and the fertilization takes place by their accidental meeting in the water.

The egg produces an embryo oyster of minute size, which is inclosed in a transparent shell and is supplied with a cilia by which the little animal is able to float with perfect ease until it becomes able to fasten itself to some stable object, though in this form many thousands are consumed by fishes and other forms of animal life. It requires from three to four years for oysters to mature. They form large congregations, called *oyster beds,* at the bottom of the water, where they are caught with a kind of dredge, or iron rake, drawn by means of a sailing boat. The most important oyster beds are found where the bottom of the sea is made up of gravel and mud deposits, and where the current is not sufficiently strong to displace them from their moorings.

In the winter time oysters accumulate a deposit of protoplasm, a highly nutritious and digestible food, when they are said to be *fat.* This so-called fatty substance is consumed during the reproductive period in the summer, when the oyster is not considered nutritious. The most productive oyster fields in America are found in the inlets and coast regions of Chesapeake Bay and Long Island Sound. Baltimore is the greatest oyster market in the world, being near the oyster fisheries of Chesapeake Bay and the Atlantic. Other valuable oyster beds occur in the Gulf of Mexico, in Puget Sound, in the Strait of Juan de Fuca, and in Georgian Bay. The oysters of the Pacific coast are smaller than those of the Atlantic, but artificial culture of species taken from Chesapeake Bay has made material progress in many regions of the Pacific coast. Productive oyster fields are found in Europe and other regions. They were cultivated artificially as early as the rise of the Roman Empire. In many localities the supply has been exhausted, but oyster culture is extending continually.

A large part of the catch of oysters is placed on the market in a fresh condition, sometimes in the shell, but more generally in bulk and in cans. The entire fresh product must be kept on ice until it is consumed, since oysters soon lose their flavor when they become warm. *Cove oysters* are those which are boiled and canned, in which condition they do not require being kept on ice. The canneries are located near the places where the catch is obtained. Oysters are served in a variety of ways, but usually fresh, fried, or in stews. The oyster product of the United States averages annually 29,500,000 bushels, which is about five-sixths of the world's supply.

Feeding. Oysters feed principally on minute plants called *diatoms* which live on the bottom or float in the water. Diatoms for their growth require fertilizing matter just as do land crops, and under natural conditions find it in more or less sufficient quantities in the water in which they live. The number of diatoms, that is the quantity of oyster food, which a given body of water will support is largely dependent upon the quantity of soluable mineral matter (fertilizer which the water contains, and if it is increased, either by natural or artificial means, the production of diatoms will also generally be increased.

In a model pond or *claire* commercial fertilizer is introduced into the water and the oysters to be fattened are placed on trays in the canal or on the bottom of the pond. A propeller driven by a gasoline engine drives the water through the canal and supplies the currents naturally created by the tides. Suitable appliances are used in filling the claire with salt water. Oysters are fattened on their natural food in a comparatively short time, but the scheme of artificially fattening has not yet been made commercially profitable.

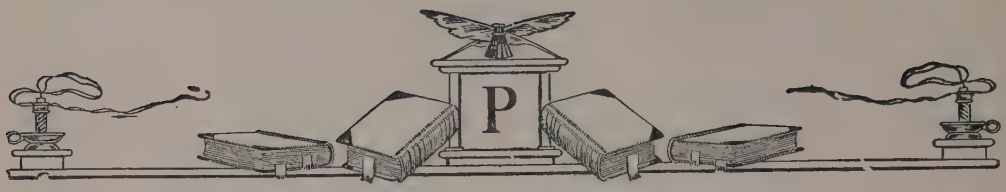
OYSTER CATCHER, a wading bird which is closely allied to the plover. It is easily known from its red feet and bill, the latter being twice as long as the head. The plumage is black and white and the wings are long and pointed. The bill is truncated at the end and has the shape of a wedge. It has no hind toe. The bird measures about sixteen inches in length. It is widely distributed in America, Europe, and other grand divisions, but the species of different regions are various, numbering about ten. Two of these are found in the northeastern part of North America. The oyster catcher inhabits seacoasts, where it feeds on small mollusks, morning worms, and minute shellfish caught at tide marks. Its cry is loud, resembling the syllables, *wheep, wheep, wheep.*

OZARK MOUNTAINS (ō'zärk), a group of hills situated principally in southwestern Missouri, but extending into northern Arkansas and the northeastern part of Oklahoma. The highest elevations do not exceed 2,000 feet. Their slopes are covered with vast forests and their mineral deposits are enormous, including lead, coal, iron, and many others. Many valleys penetrate different parts of the group, which are rich in cereals, live stock, and orchards. A continuation of the Ozark Mountains, on the south side of the Arkansas River, is known as the Ouachita Mountains.

OZOCERITE (ō-zŏ-sē'rīt), or **Ozokerite,** a substance resembling wax, found native in various parts of Austria and in Utah. It has a yellow, brown, or greenish color and is obtained from small veins in Tertiary rock. The ingredients consist chiefly of hydrocarbon. It is used to insulate electrical conductors, as a substitute or adulterant of beeswax, and in the manufacture of candles.

OZONE (ō'zōn), a colorless gas with a strong penetrating odor, regarded an active form or condition of oxygen. It usually is present in the atmosphere, where it apparently is formed by sparks of electricity passing into dry air.

Ozone has a pungent odor like that of metal, which may be noticed after a discharge of lightning and when setting in motion an electrical machine. The oxidizing effect of ozone is much greater than that of oxygen, since two volumes of it contain three volumes of oxygen, hence it serves a very useful purpose in purifying the atmosphere by destroying impurities resulting from the decomposition of animal and vegetable matter. Ozone is manufactured in abundance at a small cost by means of electricity and is rapidly entering the arts as an oxidizing agent. It serves for maturing wine and spirits, drying and thickening oils, seasoning linoleum, sterilizing drinking water, aging wood for use in manufacturing musical instruments, and many other purposes in the arts and industries.



P, the twelfth consonant and sixteenth letter of the English alphabet. The form is essentially Roman, but it was derived through the Latin and Greek from the Semitic. It is classed as a mute, nonvocal, and labial, and is formed by compressing the anterior part of the lips. In many Greek derivatives the initial *p* is silent, as in *psalm, pneumatics,* and *pterodactyl.* It is rarely silent in or near the middle of a word. As an abbreviation, it is used in such expressions as P. S., *postscript,* and P. M., *post meridian.*

PACHUCA (pȧ-chōō'kȧ), a city of Mexico, capital of the state of Hidalgo, located fifty miles northeast of the City of Mexico. It has good railway connections, is surrounded by a region containing rich deposits of silver, and has manufactures of clothing, machinery, salt, metal products, and utensils. The city is in a beautiful valley between elevated mountains. Bartolomeo Medina, in 1557, discovered at this city the process by which sulphide of copper, mercury, and salt may be used in extracting ore. Population, 1920, 38,620.

PACIFIC OCEAN (pȧ-sĭf'ĭk), the largest of the five oceans, situated west of North and South America and east of Asia and Australia. It was so named by Magellan, the first European navigator to cross it, which name he applied because of finding it calm. The extent from north to south is 9,000 miles; width from east to west, 10,000 miles; and estimated area, 70,309,000 square miles. This vast expanse of water includes about one-half of the water surface of the earth and exceeds in extent the area of all the continents. North of it is the Bering Sea, which connects the Pacific with the Arctic Ocean through Bering Strait, and south of it is the Antarctic. It is usually divided into the North and South Pacific, owing to a shallow running almost centrally through it from east to west. The North Pacific is somewhat the larger and has a mean depth of 15,420 feet. Its greatest depth is off the island of Guam, being 31,614 feet, or about equal to the height of the highest mountain in the world. The South Pacific has a mean depth of 14,200 feet and its greatest depth is 19,230 feet. Its bed is not only more uniform than the Atlantic, but the average depth is somewhat greater. The largest extent of exceptionally deep water is northeast of Japan, although vast regions of great depth are in the vicinity of the Ladrone Islands and in the section south of the Friendly Islands.

A region of calms exists along the Equator. The presence of a large number of islands causes the trade winds to be more irregular than those of the Atlantic, and to the north and south of them are other calm regions. An equatorial current passes northward along the eastern coast of Asia and divides in the vicinity of the Philippine Islands, where it forms northern and southern branches. The southern branch of this current returns in part to form the equatorial counter current, while the northern branch flows northeast along the Asiatic coast as the Kuro Sivo. It flows eastward at about 50° north latitude as a North Pacific current and, when near the shores of North America, it turns in a southern direction. The southern equatorial current of the Pacific is formed into a number of branches by islands in mid-ocean, and from the Australian continent it passes southward and is merged into the cold Antarctic current. From these main currents flow numerous branches in various directions, the principal ones being the current of Bering Strait and that of Cape Horn. Tides do not rise as high on the coasts of the Pacific as they do on the Atlantic for the reason that it is not characterized by bays as favorable to the rise of water to great elevations, the average tide height being about ten feet at several points on the western coast of North America. Their greatest heights occur in the Bay of Panama, where they attain to about fourteen feet.

The Pacific Ocean has many large continental inlets and seas, particularly on the Asiatic coast, where occur the Bering, Okhotsk, Japan, and China seas. In the island archipelago southeast of Asia are the Celebes, Java, Banda, and Coral seas. The principal inlets bordering on the American coast include the Gulf of California and the Bay of Panama. The largest inflow of rivers is from Asia, where the Amur, Hoang-ho, Yang-tse-Kiang, Menam, and Mekong flow into articulated seas. Among the principal rivers

of America flowing into it are the Colorado, Columbia, Sacramento, Fraser, and Yukon. No large inflow occurs in South America, since the continental watershed is situated along the Pacific coast and the drainage is principally toward the east. The Pacific has many productive islands, extending from the center toward the east. Among the principal island groups are the Hawaiian Islands, the Polynesian, the Micronesian, New Zealand, the Melanesian, the Philippines, Borneo, Celebes, the Japanese Islands, and Saghalien. The island groups near the American shore include the Aleutian, Queen Charlotte, Vancouver, Galápagos, and an archipelago along the coast of Chile. Balboa, a Spanish explorer, discovered the Pacific in 1513, when he sighted it from a mountain in the Isthmus of Panama. Magellan passed through the Strait of Magellan, whence he sailed across the Pacific from the east in 1620. Among the navigators to explore different regions in the 17th and 18th centuries are Tasman, Vancouver, Drake, Byron, Behring, Comte de La Pérouse, and Bougainville. Maclure discovered the Northwest Passage into the Arctic in 1850. Nordenskjöld, the Swedish explorer, discovered the Northeast Passage in 1874.

PACIFIC RAILROADS, the name which was first applied to a number of railway lines extending from the Missouri River to the Pacific coast, but later extended to all the transcontinental lines that cross North America. The first of these railroads was built under an act of Congress passed June 24, 1862, and approved by President Lincoln on July 1. By this act of Congress government aid was extended for the purpose of furthering the enterprise. The aid consisted of a land grant of 6,400 acres per mile, while government bonds bearing 6 per cent. for thirty years to the amount of $16,000 per mile were issued for branch lines and for the level regions of the main line extending from Omaha to the Rocky Mountains and from the Sierra Nevadas to San Francisco. On the other hand, the subsidy for the two mountain regions was $48,000 per mile, and for the plateau region between the Rocky Mountains and the Sierra Nevadas it was $32,000 per mile. These grants were made to facilitate the development of the vast region west of the Missouri and to connect the Pacific coast by rail with the east. The companies to construct the railway lines agreed to complete the roads by July 1, 1876, to extend railway and telegraph rates to the United States as cheaply as to private parties, to pay 5 per cent. of the net earnings into the treasury of the United States, to pay to the government the full amount of the principal of the bonds at their maturity, and to discharge the stipulated interest as it became due.

The railway lines built under this act are the Union Pacific, the Central Pacific, and the Kansas Pacific railroads. However, the companies were embarrassed financially at various times and in 1864 the land grant was increased to 12,800 acres per mile, making the total to all companies about 39,000,000 acres. In 1869 the Central Pacific and Union Pacific were completed. The Crédit Mobilier (q. v.) managed the construction and finance of the Union Pacific and became involved in a legislative scandal. Subsequently a land grant of 47,000,000 acres was given to the Northern Pacific, which has a trunk line from Saint Paul to Seattle. The office of commissioner of railroads was instituted in 1870 to supervise the accounts of the Pacific railroads. A large part of the indebtedness of these railroads was paid by the government and funded in long-time bonds at a low rate of interest.

The Pacific railroads of the United States as now organized include the Atchison, Topeka and Santa Fé, extending from Chicago to San Francisco; the Union Pacific, from Council Bluffs to San Francisco; the Northern Pacific and the Great Northern, both from Saint Paul to Seattle; and the Chicago, Milwaukee and Saint Paul, from Chicago to Seattle. Other lines, such as the Missouri Pacific and the Chicago, Rock Island and Pacific, extend a part of the distance from the Mississippi and then carry traffic through affiliated lines to the Pacific. Canada has the longest transcontinental railway of North America, the Canadian Pacific, which has a trunk line from Saint John, New Brunswick, to Vancouver, British Columbia. Another line, the Canadian National, extends from Portland, Me., to Prince Rupert, British Columbia, with proposed lines to Dawson, in Yukon. The Canadian National and its connections practically constitute a transcontinental system.

PACKARD (păk'ẽrd), **Alpheus Spring,** naturalist, born in Brunswick, Me., Feb. 19, 1839; died Feb. 14, 1905. He was the son of A. S. Packard (1798-1884), who was for some years president of Bowdoin College. The son graduated at Bowdoin College in 1861, studied medicine at the Maine Medical College, and served in the latter part of the Civil War as an army surgeon. In 1871 he became State entomologist of Massachusetts and in 1878 was made professor of zoölogy at Brown University. Packard was selected to serve on the United States Entomological Commission and is the author of authoritative works of various kinds. His principal publications include "Our Common Insects," "Insects of the West," "Zoölogy for Students and General Readers," "Guide to the Study of Insects," "Observations on the Glacial Phenomena of Labrador and Maine," "Life Histories of Animals," and "Naturalist on the Labrador Coast." For some time he edited the *American Naturalist.*

PACKER, Asa, capitalist, born at Groton, Conn., Dec. 20, 1806; died May 17, 1879. He removed to Pennsylvania in 1822, where he be-

came interested in mining and transportation schemes. For some time he transported coal from Pottsville to New York. In 1855 he completed the Lehigh Valley Railroad from Easton to Mauch Chunk. His investments proved so successful that he became one of the wealthiest men in the State. In 1852 he was elected to Congress as a Democrat and was an influential member of that body for four years. He made a number of large gifts to the Lehigh University at Bethlehem, Pa., totaling $2,500,000.

PADDLEFISH, the name of a fish found in many streams of the Mississippi valley, so named from the nose being prolonged into a bony paddle-shaped appendage. The snout is used to dig in the mud in search of food. Its habits resemble those of the catfish, since it prefers to live at the bottom of sluggish streams. It has no scales. The larger species attain a length of three to five feet. The flesh is similar to that of the shark.

PADEREWSKI (pä-dĕ-rĕf'skē), **Ignace Jan,** noted Polish pianist, born in Podolia, a Russian-Polish province, Nov. 6, 1860. At the age of three years he was able to play on the piano and when seven years old was placed under an instructor. In 1872 he began to study under Roguski and Kiel in Warsaw and four years later made a musical tour through Russia, Rumania, and Siberia. He became professor of music in the Warsaw Conservatory in 1878, and in 1884 was chosen to the same position at the Conservatory of Strassburg. Subsequently he took advanced musical work in Berlin and Vienna, studying in the latter city under Teschitzki. In 1888 he began a professional tour of Germany and the following year appeared with much success in Paris. He played in London in 1890 and in 1892 made a highly successful tour in the United States. In 1893 he visited the World's Fair at Chicago, where he secured $150,000, and in 1896 made a tour in America, by which he realized $187,000. Subsequently he made other highly successful visits to Canada and the United States and played in many of the leading cities. His compositions include more than ninety works, most of which were written before he was 25 years of age. His productions include "Polish Fantasie," "Song of the Voyager," and "Menuet Moderne." He was the first president of Poland, serving until 1919, when he was succeeded by Joseph Pilsudski.

IGNACE J. PADEREWSKI.

PADILLA (pä-thēl'yä), **Juan Lopez de,** Spanish insurrectionary leader, born in the latter part of the 15th century at Toledo, Spain; executed April 24, 1521. He was the eldest son of the commentator of Castile, secured the military command of Saragossa from Charles V., but soon after joined the popular movement against excessive taxation and was chosen leader by the people. After a series of successes, his army was defeated at Villalar on April 23, 1521, when he was captured and beheaded. The insurrectionary forces held Toledo for some time after his death under the direction of his wife, but she was compelled to flee for safety to Portugal and the movement was suppressed.

PADUA (păd'ū-ä), a city of northern Italy, capital of a province of the same name, situated on a plain 23 miles west of Venice. The city occupies a picturesque site on the Bacchiglione River, which is crossed by a number of bridges. The streets in the older part are narrow, but in the newer portion they are platted according to modern plans, intersecting each other at right angles, and the buildings are mostly high. It has good railroad connections, a public school system, a chemical laboratory, an observatory, a museum of natural history, and a library of 125,000 volumes. Among the noteworthy buildings are the churches of Santa Giustina, San Giorgio, and San Antonio, a cathedral, the city buildings, and the University of Padua, an institution founded in 1221. This university has seventy professors and is attended by about 1,650 students. It has manufactures of cotton and woolen goods, clothing, machinery, porcelain, and silk textiles. Padua ranks among the earliest cities of Italy and in Roman times was known as Patavium. It was remarkably prosperous in the first century of the empire, when it had vast woolen manufactures. Attila destroyed the city in 452, but it again rose to vast commercial and educational importance in the Middle Ages, and was conquered successively by the Venetians, Austrians, French, and Germans. The Austro-Germans bombarded it with aërial fleets in 1917 and 1918. Population, 1922, 105,125.

PADUCAH (pä-dū'kä), a city in Kentucky, county seat of McCracken County, on the Ohio River, eighty miles southwest of Evansville, Ind. It is on the Illinois Central and the Nashville, Chattanooga and Saint Louis railroads. The notable buildings include the county courthouse, the public library, the Federal building, and the high school. Among the manufactures are flour, tobacco, ships, machinery, hardware, furniture, and tobacco products. Paducah is one of the most important tobacco markets in the United States. It has a growing trade in pork, iron, corn, lumber, and merchandise. Paducah was settled in 1827, when it was platted and was chartered as a city in 1856. It was fortified by General Grant in 1861. Population, 1900, 19,446; in 1920, 24,735.

PÁEZ (pä'äth), **José Antonio,** soldier and

statesman, born at Araure, Venezuela, June 13, 1790; died May 7, 1873. He descended from native and Spanish parentage and spent his early life as a herdsman. In 1810 he joined the revolutionary party and soon after became general of a division. In 1821 he took part in the Battle of Carabobo and commanded at the capture of Puerto Cabello, the last port held by Spain. He became the first president of Venezuela, in 1830, and served as president a second time from 1839 until 1843. Soon after he organized a civil war, but was defeated and banished. In 1860 he was made minister to the United States and the same year was proclaimed dictator by the army. His administration of three years was disturbed by civil wars and he was finally defeated in 1863, after which he resided in New York City.

PAGANINI (pä-gä-nē'nē), **Nicolò**, distinguished violinist, born at Genoa, Italy, Feb. 18, 1782; died in Nice, May 27, 1840. His first musical training was given by his father and at the age of nine years he made his appearance in public at Genoa, where he met with much success. Soon after he devoted a number of years to diligent study and practice and in 1805 began a successful tour of Europe, in which he attained especial successes in Vienna, Berlin, and Paris. By 1828 his reputation had become extended to the whole of Europe and in 1829 he visited Paris. Two years later he played at King's Theater, London, and soon after returned to Italy with a princely fortune, but much of it was lost in speculative enterprises. Paganini developed an impressive and passionate style and no violinist since his time has been able to excel him. The Pope decorated him with the Order of the Golden Spur in 1827 and he was honored by other personages and societies.

PAGE, David Perkins, educator, born at Epping, N. H., July 4, 1810; died Jan. 1, 1848. He studied at the Hampton Academy and engaged in school teaching. In 1845 he became principal of the State normal school at Albany, N. Y., where he remained as teacher and principal until his death. This institution was modeled largely after a plan devised by Horace Mann, whose personal friendship he enjoyed. He is best known by his work on teaching, one of the first and most extensively used in the United States, entitled "The Theory and Practice of Teaching."

PAGE, Thomas Nelson, lawyer and author, born in Oakland, Va., April 23, 1853. He studied at Washington and Lee University, received a degree in law from the University of Virginia in 1874, and soon after began to practice in Richmond. Washington and Lee University conferred a degree upon him in 1887. Much of his literary work is in the familiar southern dialect. His books include "In Ole Virginny," "Befo' de War," "Unc' Edinburg," "Pastime Stories," "Among the Camps," "Two Little Confederates," "The Old South," and "Elsket and Other Stories." He died Nov. 1, 1922.

PAGE, William, portrait painter, born in Albany, N. Y., Jan. 23, 1811; died in Tottenville, Oct. 1, 1885. He was a student of painting under Samuel F. B. Morse, later took a course at the National Academy of Design, and pursued theological studies for two years at Andover and Amherst. It was his desire to engage in ministerial work, but later he developed a desire to become a painter, for which purpose he settled in New York. Likenesses of William L. Marcy, John Quincy Adams, Browning, Beecher, and others were among his first noteworthy productions. He was elected a member of the National Academy in 1836 and in 1849 went to Europe, where he remained eleven years. Most of his time during that period was spent at Florence and Rome in studying the works of eminent masters and, on his return to America, he delivered a series of lectures at the National Academy of Design. Several of his paintings are in Faneuil Hall, Boston, and one of Farragut, showing that hero in command of the naval forces at Mobile, was presented to the Czar of Russia in 1871. His principal works include "Infancy of Henry IV.," "The Holy Family," "Farragut's Triumphant Entry into Mobile," "Antique Timbrel-Player," "Moses and Aaron on Mount Horeb," "The Flight into Egypt," "Shakespeare, from the German Death-Mask," and "Venus."

PAGET (păj'ĭt), **Sir James, Baronet**, noted surgeon, born in Yarmouth, England, Jan. 11, 1814; died Dec. 30, 1899. He studied at Saint Bartholomew's Hospital, London, where he received a degree in medicine. In 1863 he became surgeon to the Prince of Wales and in 1877 was made sergeant surgeon to Queen Victoria. He was vice chancellor of London University from 1884 to 1895. In recognition of his many valuable discoveries in surgery, he was created a baronet in 1871 and was granted degrees by a number of important educational institutions. He served for some time as commissioner to inquire into the condition of the hospitals in London and received distinguished honors at the jubilee commemorating the founding of the University of Wurzburg, Germany. Many scientific societies extended recognition to him, including the Academy of Sciences of France. He contributed to the Royal Society. His best known writings include "Results of the Use of the Microscope," "Lectures on Surgical Pathology," "Clinical Lectures," and "Records of Harvey."

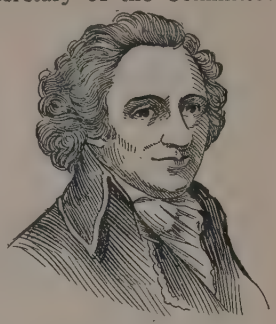
PAGODA (pä-gō'dä), the name applied to a great variety of public buildings in Asia, particularly in India, Japan, and China. Most of these structures are places for public worship. The pagodas in China are largely towers from six to nine stories in height, such as the famous porcelain tower at Nankin, which was destroyed by insurgents in 1856. Nearly every town in China has one or more of such structures. They are octagonal in form, have open

courts, and are usually constructed of brick with a covering of porcelain, giving them a singular brilliancy of effect. In India these pagodas are square edifices of great extent, the base comprising central chambers and porticoes and terminating upward in pyramids or spires. They vary from 15 to 30 feet in diameter and from 20 to nearly 400 feet in height.

PAINE, John Knowles, composer, born in Portland, Me., Jan. 9, 1839; died April 25, 1906. He acquired skill as an organist in his native city, after which he went to Berlin, Germany, where he studied three years under Haupt, Wieprecht, and Teschner. In 1861 he returned to Boston, where he served as an organist, and later gave organ concerts in many cities of America. He was made instructor in music at Harvard University in 1862. In 1876 he was elected to the chair of music in that institution. Most of his early compositions may be classed with the classical school and his later works are more of the romantic order. He composed the music of the "Centennial Hymn," words by Whittier, which was sung in 1876 at Philadelphia. Among his best known works are the oratorio "Saint Peter," the cantata "Realm of Fancy," the cantata "Nativity," and the symphony entitled "Spring." His overtures "As You Like It" and "The Tempest" gained much applause. He published "Famous Composers and Their Works."

PAINE, Robert Treat, statesman and signer of the Declaration of Independence, born in Boston, Mass., March 11, 1731; died there May 11, 1814. He graduated at Harvard University in 1749 and, after taking a theological course, became a minister. Later he studied for the bar and was admitted to practice law in 1759. He first attracted general attention by prosecuting a British officer for participating in the Boston massacre of 1770, and in 1773 was elected a member of the Massachusetts Assembly. In 1774 he was elected to the Continental Congress, in which he served until 1778, and, after the formation of the United States government, he was attorney-general of Massachusetts from 1780 to 1790. He was judge of the supreme court of the State from 1790 to 1804. He is the founder of the American Academy of Arts and Sciences.

PAINE, Thomas, author and statesman, born in Norfolk, England, Jan. 29, 1737; died in New York City, June 8, 1809. He was the son of a staymaker, under whom he learned the art of staymaking. Later he became attached to a government customhouse and afterward had charge of a tobacco manufactory. He was from nature a devoted republican, giving much attention to the study of political questions. In 1774 he came to the United States and for a time edited the *Pennsylvania Magazine* at Philadelphia. In 1776 he published a pamphlet entitled "Common Sense," in which he maintained the cause of the colonies against England, and a year later published "The Crisis." These publications won him the friendship of Franklin, Washington, and other leaders, and Congress rewarded him by appointing him Secretary of the Committee of Foreign Affairs. It is thought commonly that these two works of Paine were the means of consolidating the army in favor of independence, and, when a committee of loyalists had been appointed to make a reply to them, it dissolved on the grounds that it regarded the propositions advanced as unanswerable. The first words of the "Crisis" are "These are the times that try men's souls," which became a battle cry of the patriots.



THOMAS PAINE.

In 1779 Paine became clerk of the Pennsylvania Legislature. Congress, in 1785, granted him the New Rochelle farm and $3,000 in cash. He returned to England in 1787, where he published, in 1791, his celebrated "Rights of Man," the most famous answer written to Burke's "Reflections on the Revolution in France," but it compelled him to flee to France for safety. There he was treated with the greatest respect and elected to the national convention, where he favored Louis XVI., who was then on trial. This course offended Robespierre and he was confined in prison eleven months, escaping the guillotine only by accident. While in prison he wrote a portion of the "Age of Reason," the first part of it having been completed before his confinement, and the whole was published in 1794. This work treats largely of revealed religion, the author holding that Christianity is not the true religion, and by its publication he forfeited the friendship of many former associates in America and Europe. In 1802 he returned to the United States, where the remainder of his life was spent in the study of mechanical inventions and political questions in New York City.

PAINTING, the art of covering surfaces with pigments or variously colored substances for preservation or decoration, or with the view of representing objects in nature on a surface. As one of the fine arts, painting has for its aim the artistic representation of ideal objects or scenes, or of ideas. A mastery of this art involves a knowledge of form, design, perspective, color, and light and shade. The three general methods of painting consist of *drawing,* including pencil, crayon, charcoal, pastel, and water color work; *oil painting,* embracing work on canvas or panel; and *mural painting,* including the technical processes of fresco, distemper, and encaustic. Other species of painting include porcelain, vase, glass, terra

(Opp. 2080) LEONARDO DA VINCI'S "THE LAST SUPPER."

cotta, and enamel painting. The majority of paintings are executed with oil, but there are such exceptions as *distemper,* which is done with an aqueous medium; *encaustic,* with a wax medium; and *glass* and *enamel,* with an essential oil. *Oil colors* include all those which are obtained by grinding colors with oil. *Water colors* consist of those in which glycerin and gum are utilized. Painting is designated in accordance with the subject represented, as decorative, portrait, landscape, marine, historical, genre, fruit and flower, battle, architectural, and miniature painting.

Painting as an art has come down to us from remote antiquity. Ruins dating from the 18th century B. C. indicate that paintings and sculptures decorated the walls and temples at Thebes. The prophet Ezekiel mentions the Babylonian and Chaldaean styles of painting which were adopted in Jerusalem before 598 B. C. These ancient productions were of great beauty and durability, but were largely in the form of decorations on rolls of papyrus. In many regions they were employed to decorate the walls of temples and tombs, mummy cases, and various public buildings. Greece was the most highly developed in painting among the ancient nations. The most celebrated Greek schools of art were at Athens, Corinth, Rhodes, and Sicyon, and the renowned painters of Greece include Polygnotus, Cimon, Timanthes, and Panaenus, who lived about 400 years before the Christian era. Artistic painting was carried from Greece to Rome, where, according to Pliny, it was introduced about 650 B. C. from Corinth. However, Rome developed no great painters, the work there being executed largely by Greek artists, though there are many specimens of art that were produced by Etruscan and Byzantine masters. Italian painting developed some time after the conquest of Constantinople by the Latins, in 1204, and it was later taken to Germany, France, and Bohemia.

Oil painting was introduced at the beginning of the 15th century. It was the means of stimulating a better development of expression and brought forward masters in many of the European countries. They developed remarkable qualities for invention, elegance in color, and grace in imparting individuality of character. Leonardo da Vinci was among the early artists to develop deep shadows and enlarge upon indoor effects. Rembrandt employed extreme contrasts of light and shade, Jan Van Eyck turned attention to brilliancy and transparency of coloring, Michael Angelo surpassed all other artists of his time in grandeur of design, Guido Reni aroused interest in elevated landscape painting, and others developed skill in a largely diversified field of painting, most of whom are treated in special articles of this work. The success of researches into ancient remains has centered the works of great artists in museums, where they may be studied with helpful effect. On the other hand, the accumulated products of the last two centuries attract the attention to the works of modern times, giving students an opportunity to study the productions of many schools of painting. See **Hogarth; Millet; Meissonier; Lessing; Menzel; Rossetti; Millais; West; Murillo; Whistler,** etc.

PAINTINGS, Twelve Great, the paintings classed by William Whetmore Story, an American art critic, as the most celebrated in the world. These include the following works of art:

The Last Supper, Da Vinci, 1498, Santa Maria Delli Grazie, Milan.

Beatrice Cenci, Guido Reni, 1509, Barberini Palace.

The Assumption of the Virgin, Titian, 1518, Venetian Academy.

Sistine Madonna, Raphael, 1518, Dresden Gallery.

The Transfiguration, Raphael, 1519, Vatican in Rome.

The Night, Correggio, 1522, Dresden Gallery.

The Last Judgment, Michael Angelo, 1541, Sistine Chapel.

The Descent from the Cross, Volterra, 1545, Church of de' Monti, Rome.

Aurora, Guido Reni, 1609, Rospigliosi Palace, Rome.

The Descent from the Cross, Rubens, 1612, Antwerp Cathedral.

The Communion of Saint Gerome, Domenichino, 1614, Vatican, Rome.

The Immaculate Conception, Murillo, 1678, Louvre, Paris.

PAINTS, the general name of compounds used in painting, consisting chiefly of a coloring substance mixed with a liquid of such a nature that a thin film will be formed after exposure to the air. Various pigments are used in mixing paints, such as indigo, cochineal, and numerous minerals. The minerals include white lead, graphite, lampblack, ocher, vermilion, prussian blue, cadmium yellow, and many others. The vehicle used chiefly is linseed oil. It is expressed from the seed of flax and may be used either raw or boiled, but boiling gives it the advantage that it will dry quicker when exposed to air. A small quantity of turpentine is sometimes added to thin the mixture and cause it to dry more quickly when applied. Kerosene is sometimes used as a substitute for turpentine, but it is not a good ingredient.

PAISLEY (pāz'lĭ), a city of Scotland, in Renfrewshire, on the White Cart River, about seven miles southwest of Glasgow, with which it is connected by railways. It has a number of fine streets, which intersect each other at right angles. Among the principal buildings are the Abbey Church, the Coats Memorial Baptist Church, the courthouse, the Neilson Educational Institution, the school of design, and the grammar school founded by James VI. It has a free public library and museum, a number of

parks, modern municipal facilities, and several fine monuments. Among the manufactures are carpets, embroidery, soap, flour, starch, chemicals, ships, machinery, spirituous liquors, cotton and woolen goods, silk textiles, and tartan cloths. The city was founded about 1163 and in 1307 was captured by the English, who burned most of it. Paisley became a free town in 1488. The building of railways and canal improvements has added greatly to its prosperity. Population, 1907, 81,408; in 1921, 84,477.

PAKENHAM (păk'ẹn-ạm), **Sir Edward,** British soldier, born at Pakenham Hall, Ireland, March 19, 1778; killed in battle, Jan. 8, 1815. He was a brother-in-law of the Duke of Wellington, entered the British army in 1794, and served in the Peninsular War. In 1814 he was given command of the British forces stationed at New Orleans, where he was opposed by Gen. Andrew Jackson, who defeated him at that city on Jan. 8, 1815. Pakenham was among the slain.

PALACKÝ (pä'lăts-kē), **František,** philologist and historian, born at Hodslavitz, Bohemia, June 14, 1798; died in Prague, June 26, 1876. He studied at Pressburg and Vienna, devoting himself principally to philology and history, and in 1831 was appointed the compiler of Bohemian history. To further this work he consulted the libraries and archives of Bohemia, Germany, and Italy, and in 1836 published five volumes of "The History of Bohemia." In 1848 he was identified with the extensive political agitation and was the leader of the Slavs in opposition to the German party at the diet of Kremsier. He was elected to the Austrian house of lords in 1861, but declined the position on account of being opposed to the reorganization of Austria on a Germanic basis. His later publications include the "Political Testament" and a treatise on aesthetics.

PALAIS ROYAL (pä-lā' rwä-yäl'), a group of buildings in Paris, France, on the east side of the Rue Richelieu. They include a former palace, public gardens, and several theaters and are used as a public pleasure resort. The palace was built about 1635 by Cardinal Richelieu, who transferred it to Louis XIII., and later it became the residence of the Duke of Orleans. Louis Philippe occupied it until 1830, when it became the property of the state. In the Revolution of 1848 it was greatly damaged by a mob and many of the contents were destroyed, but it was afterward restored and occupied by Prince Napoleon, the son of Jérôme Bonaparte. In 1871 it was partly destroyed by a fire which had been started by the Communists, but was again restored in 1873. At present it is one of the finest and most frequented resorts in the city. It includes the Theatre Francais, which is devoted to high comedy.

PALANQUIN (păl-ạn-kēn'), or **Palankeen,** a vehicle used to convey travelers in the eastern part of Asia, especially in China and Japan. It is in the form of a litter, or box, and is carried on the shoulders of two men by means of poles. The seat is narrow, intended for only one person. Formerly conveyance was almost exclusively by the palanquin, but the construction of highways and the building of electric and steam railways have made this mode of traveling less popular.

PALATE (păl'ăt), the bony and muscular partition that separates the mouth from the nasal cavities. It consists of two parts, the hard palate and the soft palate. The *hard palate* is formed of bone and lined by mucous membrane and forms a support for the tongue in speaking and swallowing. The *soft palate* descends like an apron from the back edge of the hard palate and is composed largely of muscles. It is covered in the upper part with mucous membrane like that of the nasal passages and below, like that of the mouth. The *uvula,* an extension of the lower border of the soft palate, can close either the opening to the nasal passages or the opening from the pharynx to the mouth. On each side of the soft palate are two curved folds called the *arches,* or *pillars,* and between these, on both sides of the pharynx, are the *tonsils,* two glandular bodies. Acute sensibility is seated in the soft palate and the uvula and its arches. They administer to the special sense of taste. The soft palate has many glands that secrete mucus to lubricate the throat as a means to facilitate the passage of food.

PALATINATE (pä-lăt'ĭ-nāt), in German, *Pfalz,* the name of two states of the Old German Empire. They were known as Upper and Lower Palatinate. Amberg was the capital of Upper Palatinate and Mannheim of Lower Palatinate, but the two districts were united into one government about 1620. The princes governing these possessions were long counted with the most powerful of the German Empire. In 1648 the Peace of Westphalia again separated the two states by giving Upper Palatinate to Bavaria. At the same time Lower Palatinate was made an electorate of the empire and was long held by Frederick III. and his successors. The Treaty of Paris, in 1814, gave the greater part of Lower Palatinate to Bavaria and a portion was annexed to Prussia and Hesse-Darmstadt. Other minor changes were made by the Paris Treaty of 1815. At present a portion of the region is detached from Bavaria and called Rhenish Bavaria and the remainder is classed with Bavaria proper.

PALATINE HILL (păl'ă-tīn). See **Rome.**

PALAWAN (pä-lä'wän), or **Paragua,** an island of the Philippines, situated east of the China Sea, west of Negros and Panay, and north of Borneo. It has an area of 7,575 square miles and ranks as the third in size of the islands in the Philippine Archipelago. The surface is largely mountainous, but there are extensive valleys and coast regions of fertility,

and the mountain slopes are well timbered. Tobacco, rice, palms, live stock, cereals, and fruits are grown in abundance. The climate is quite moist and somewhat unhealthful. Lead, iron, copper, antimony, and granite are among the minerals. Puerto Princesa and Taytay are the chief towns. The natives are peaceful. They include only a small number of Christians. Population, 1921, 30,000.

PALENQUE (pä-län'kä), a former city of Mexico, near the village of Santo Domingo del Palenque, in the state of Chiapas, about 75 miles northeast of San Cristobal. It dates from the period preceding the Spanish conquest and contains a number of intensely interesting ruins. These include the remains of several temples and palaces, the largest of which was 180 feet wide and 220 feet long. A group of twelve pyramids is nearly intact, the highest of these structures being about 80 feet. An arched subterranean waterway about ten feet high, seven feet wide, and 600 feet long is still in a fair state of preservation. The builders of these structures belonged to the Mayan stock.

PALEONTOLOGY (pā-lē-ŏn-tŏl'ŏ-gy), the science which treats of life upon the earth before the creation of man. It relates to the study of both plant and animal life and is based upon our knowledge of fossils. As a science it is closely related to biology, geology, and physiography. Cuvier is generally regarded as the founder of this science, since he was the first to point out in a scientific way many organisms which are distinctly different from those living on the earth at present. His research relates specially to the fossil species of elephants and the Siberian mammoth. The progress made since that time, in 1796, has enabled geologists to classify rock formations and to divide geological time into the now generally accepted periods and systems.

PALEOZOIC ERA (pā-lē-ō-zō'ĭk), the division of geological time which is preceded by the Archaen and succeeded by the Mesozoic eras. It includes the Cambrian, Silurian, Devonian, Carboniferous, Permian, and Triassic. The ages of invertebrates, of coal plants, and of reptiles are embraced in the Paleozoic Era. See **Geology.**

PALERMO (pä-lĕr'mō), a seaport city of Italy, on the northern shore of Sicily and on the Gulf of Palermo, 120 miles west of Messina. It was the capital of the former dominion of Sicily and is now the capital of the province of Palermo and of the island of Sicily. It is situated on a beautiful site, is connected by railways with the important towns of the island, and has a number of excellent public buildings. Among these is a Gothic cathedral, dating from the 10th century, which contains a number of statues and the monuments of Emperor Frederick II. and of King Roger, the founder of the Norman monarchy in the island. Other buildings include the churches of Saint Peter and Saint Dominic, the Palermo University, the royal palace, and the central railway station. It has extensive public libraries and gardens, the national museum, three theaters, an archbishop's palace, and colleges of medicine, arts and sciences, and industry. The harbor is commodious and is protected by a battery and a lighthouse. Among the manufactures are cotton textiles, silk and woolen goods, boots and shoes, glass, oilcloth, wine, sailing vessels, oils, machinery, chemicals, and musical instruments.

Palermo has a large trade in manufactures, fruits, perfumery, wine, silk textiles, and earthenware. It is the seat of an extensive arsenal and has large fishing interests, the latter employing about 40,000 persons. Many modern improvements have been introduced, including telephones, electric and gas lights, and a fine system of street railways. It is thought that Palermo was founded by the Phoenicians and was known to them as Panormus. When Sicily was a possession of Carthage, it became the capital. The Romans conquered it in 254 B. C., the Vandals in 440 A. D., and the Normans in 1072. Subsequently it was held by the German emperors, but since 1282 its history is identified quite closely with the kingdom of Sicily. Revolts against the kings of Naples occurred at various times. These kings made it their residence from 1806 to 1815, but through the activity of Garibaldi it became free in 1860. The modern prosperity of Palermo is due principally to its vast commercial trade, fisheries, and manufactures. Population, 1922, 348,156.

PALESTINE (păl'ĕs-tīn), a city in Texas, county seat of Anderson County, 180 miles northeast of Austin, on the Southern Pacific and the Missouri Pacific railroads. The surrounding country produces vast quantities of live stock, cereals, cotton, and fruits. It has the county courthouse, wholesale houses, a Y. M. C. A. building, a public library, and many fine schools and churches. The public utilities include waterworks, sanitary sewerage, and electric lighting. Iron ore and salt are mined in the vicinity. Among the manufactures are cotton-seed oil, flour, cigars, pottery, machinery, metal products, and utensils. It was settled in 1846 and incorporated in 1870. Population, 1920, 11,039.

PALESTINE, the Holy Land, or **Canaan,** a state under British mandate, located on the eastern shore of the Mediterranean Sea, comprising the southern part of Syria. The extent from north to south is about 145 miles; width, 80 miles, and area, 12,000 square miles. The coast line is quite uniform, the principal indentation being the Bay of Acre. Immediately south of this bay is Mount Carmel, which is the largest point of land that extends into the sea. It has an abundance of drainage toward the west into the Mediterranean and toward the east and south into the Dead Sea, although the Jordan is the principal river. Other streams of note embrace the Leontes, Kishon, Kanah, Brook

Sorek, Gadara, and Jabbok. Three noteworthy lakes are within the region, including Lake Merom in the north; the Sea of Galilee, a body of water 682 feet below the Mediterranean; and the Dead Sea, a sheet of water 1,317 feet below the Mediterranean.

The central portion of Palestine is a tableland with a mean height of about 1,600 feet. In the east is the depressed valley of the Jordan, extending from north to south, and along the coast are the Maritime plains and the plains of Jericho and Esdraelon. The descent from the central plateau to the Dead Sea and the Jordan is rugged and precipitous, but toward the west it is more gradual, though there is a hilly region toward the Maritime plains, sometimes called the plains of Philistia and Sharon. The principal elevations include Jebel Jermuk, 3,935 feet; Hebron, 3,030 feet; Mount of Olives, 2,725 feet; Mount Tabor, 1,900 feet; and Mount Gerizim, 2,700 feet. The general elevation at Jerusalem is 2,610 feet. Minerals of value are found in the mountain regions, including principally ironstone, rock salt, sulphur, and asphaltum. The Jordan River and the Sea of Galilee supply an abundance of fish. Among the wild animals are the wolf, hyena, porcupine, jackal, boar, and bear, most of which are common to the mountain regions, while numerous species of birds, such as ravens, hawks, eagles, storks, vultures, nightingales, and sparrows, are abundant.

The trees native to Palestine include the walnut, oleander, olive, cedar, sycamore, palm, ash, fig, elder, pine, and carob. Fruits are cultivated in abundance, such as the orange, apricot, almond, lime, pear, quince, apple, plum, and grapes. The principal cereals include barley, wheat, rice, and maize. Sugar cane, tea, potatoes, and garden vegetables are grown extensively. Silk culture is a growing industry. Besides the domestic animals common to Europe, it has large interests in rearing the camel, ass, mule, and goat. The manufactures embrace wine, olive oil, ornaments, jewelry, clothing, utensils, and food products. Summer and winter make the two seasons of the year, the former extending from April to November, when rainfall is limited, but during the remainder of the year there is an abundance of moisture. The ground is rarely frozen, except in the mountains, and much of the surface is fertile.

Palestine was inhabited by six nations when the children of Israel invaded it, after they had sojourned forty years in the desert. These nations were the Ammonites, Canaanites, Hittites, Perizzites, Hivites, and Jebusites. At that time allotments were made to the different Hebrew tribes, though the war for possession continued at varying intervals. The government continued to be tribal, with marked distinctions, until the rise of the Judges. Later it was consolidated into a kingdom, of which Jerusalem became the capital, in the time of David. In the meantime the cities of ancient renown rose and fell at various periods, but at present there are scarcely any evidences of the important places known in history as Diospolis, Caesarea, and Antipatris. The Israelites were carried off in captivity by the Babylonians, and, when they returned, the industries again developed, though the Philistines continued to possess a part of the country. At the birth of Christ Palestine was a Roman possession. It was made up of the four provinces of Judaea, Galilee, Perea, and Samaria. Roman possession augured for its material prosperity, since it had the effect of counteracting local contentions. However, the measures adopted for its government by Vespasian caused a decline in the material welfare. When Titus invaded the region, he destroyed the temple of Solomon and attempted to Romanize the people.

Christianity developed with considerable rapidity in the time of Constantine, when the Church of the Holy Sepulcher was built. In 606 the Saracens under Omar were severe in endeavoring to destroy the foothold of the Christian religion, fearing that it would eventually predominate. Soon after the Crusaders began to rally to the defense of Christianity. The contests of this period are among the most memorable in the world, when legions of Mohammedans poured into the contest for the defense of Moslem supremacy in the Holy Land. It was governed for many years by the Sultan of Egypt, but in 1517 the Turks made it a part of their dominion. Several railroad lines were built in the last century, when Jerusalem and other cities were connected with the Mediterranean. Extensive explorations for antiquities began to develop about 1870, when the American Palestine Exploration Society was formed. Since then valuable data have been secured by organizations from many countries, giving rise to an accumulative fund of geographical, historical, geological, and topographical knowledge of the region. It is a center of interest for Christians, Jews, and Mohammedans, since it is the cradle of their religious systems. The British, under General Allenby, invaded Palestine in 1917 and captured Joppa and Jerusalem. Population, 1922, 782,500. See **Jews.**

PALESTRINA (pä-lăs-trē'nä), **Giovanni Pierluigi da,** eminent musical composer, born in Palestrina, Italy, in 1524; died Feb. 2, 1594. In 1540 he went to Rome to study music under Claude Goudimel. Soon after he became a musical director under an appointment of Pope Julius III. in the Julian Chapel of Saint Peter. He published a collection of masses in 1554 and the following year was made a singer in the Sistine Chapel. When the pontificate became vested in Paul IV., Palestrina lost the position, for the reason that the former considered celibacy a necessary qualification to be the musical director, but in 1555 he became choir master of Saint Maria Maggiore, and in 1571 was restored

at Saint Peter's. His compositions are remarkable and include a number of celebrated masses, among them the "Mass of Pope Marcellus." Palestrina may be regarded the first composer to conform musical science to musical art. His productions are very voluminous, including six books of "Motets," thirteen books of "Masses," three books of "Madrigals," and a number of books of hymns, lamentations, and litanies.

PALFREY (pal'frĭ), **John Gorham,** author and clergyman, born in Boston, Mass., May 2, 1796; died April 26, 1881. He studied at Harvard, where he graduated in 1815, and later took a course in theology. For some time he was minister of a Congregational church in Boston, and in 1831 became professor of sacred literature in the Harvard Divinity School. He was elected to the State Legislature in 1842, became secretary of State in 1844, and was elected to Congress in 1848. He was postmaster of Boston from 1861 until 1867. His writings include "History of New England During the Stuart Dynasty," "The Relation Between Judaism and Christianity," and "Fragments of the Greek Comic Poets." He was editor of the *North American Review* for eight years, from 1835 until 1843.

PALGRAVE (pal'grāv), **Sir Francis,** historian, born in London, England, in 1788; died in 1861. He studied law and took up literary work. In 1838 he was made deputy keeper of the records of Queen Victoria, which office he held until his death. During this service he gathered many valuable records and published a number of historical works of a high class. These include "History of England," "The Parliamentary Writs," "Rise and Progress of the English Commonwealth," and "Essay on the Original Authority of the King's Council."

PALI (pä'lê), the name of the literary language of the Buddhists, now represented chiefly in Ceylon, Siam, Burma, and Cambodia. It is closely allied to Sanskrit, showing about the same relationship to that language as Italian does to Latin. Europeans began to study Pali about the middle of the last century. In Siam and Ceylon the law books are in the vernacular, but in Burma the law is in the Pali, although it is accompanied by a Burmese glossary.

PALIMPSEST (păl'ĭmp-sĕst), an ancient parchment or other writing material written upon twice, the original writing having been erased to fit it for a subsequent record. The fact that such parchments were produced may be attributed to the Saracen conquest of Egypt, on account of which the supply of writing material became limited. The consequent exaggerated price made it necessary for many of the Greeks and Romans to restore by scraping or washing the materials which had formerly been used for writing purposes. In this way it was possible to render them capable of being utilized a second time. The erasure was made either with pumice stone and an edged implement, or by washing with a sponge, but in most cases the erasure was imperfect, owing to the fact that inks had been used which could not be easily removed. Many of the palimpsest parchments have been of double value, since the newer writing has been used and the older has in many cases been restored by the use of chemical reagents. Restoration is possible by infusion of gall, acids, or oil, these substances acting upon certain traces of the material of ink remaining in the parchment. Among the writings restored in this way are large fragments of the "Iliad" of Homer, the "Republic" of Cicero, the "Institutes" of Caius, the "Origines" of Isidorus, and portions of the histories of Siculus, Diodorus, Polybius, Appianus, and Dionysius of Halicarnassus. Among the most successful students of these documents are Niebuhr and Cardinal Angelo Mai (1782-1854).

PALISADES (păl-ĭ-sādz'), the name applied to the columns of rock which extend along the western side of the Hudson River, extending a distance of nearly twenty miles, from Weehawken, N. J., to Haverstraw, N. Y. The escarpment is formed of trap rock, which, while in a molten state, was forced by volcanic action upward between the layers of sandstone and shale. The Palisades vary from 200 to about 550 feet, reaching their greatest height at Indian Head, directly opposite Hastings. The cliffs are everywhere abrupt and admit of passage to the river at only a very few points.

PALISSY (pä-lê-sê'), **Bernard,** potter and painter, born in Agen, France, in 1509; died in Paris, in 1590. He first studied as a glass and portrait painter, but later devoted much attention to the study of producing fine pottery, having become interested in that art by working as an apprentice to an Italian potter. Palissy became a devoted Protestant, for which he was imprisoned at Bordeaux. Later he was liberated and was made potter to the King of France. He was saved from the massacre of Saint Bartholomew by Catherine de' Medici. His principal works in Paris were on the grounds now occupied by the Tuileries, the name meaning tile kiln, being derived from his tile works. He lectured on physics and natural history for a period of about ten years, beginning in 1575, but the persecutions then directed against the Huguenots caused him to be imprisoned in 1585 in the Bastille, where his death occurred. Many specimens of his art are preserved in the museums of France, especially at the Louvre, in Paris.

PALLADIO (pal-lä'dê-ō), **Andrea,** architect, born at Vicenza, Italy, Nov. 30, 1518; died Aug. 6, 1580. He studied architecture under several celebrated teachers and in 1548 took up his residence in Rome, where he made careful drawings and measurements of the more important edifices. On returning to Vicenza, he drew designs for several buildings, including the arcade of the Basilica of Vicenza.

Paul III. summoned him to Rome for advice respecting the work which was then in progress on Saint Peter's. He is the author of a work entitled "Treatise on Architecture."

PALLADIUM (păl-lā'dĭ-ŭm), an image of Pallas or Minerva, which is said to have been brought to earth by Jupiter and placed near the city of Troy. It was reputed to be associated with favorable omens and, according to tradition, Troy could never be taken while the image remained in the city. The Greeks commissioned Ulysses and Diomedes to secure it, and later it was carried to Italy by Aeneas. Several cities of Europe claim to have possessed it, including Athens, Rome, and Lavinium.

PALLADIUM, a metal discovered by Wollaston in 1803. It is found native in small quantities with gold and platinum. This metal is grayish white and somewhat resembles platinum in color and luster. It is both ductile and malleable, and is harder and more fusible than platinum. Only small quantities being obtained, it is not employed extensively for useful purposes. Dentists employ it in some instances as a substitute for gold in filling teeth. It is used to some extent for beams in delicate balances and various parts of scientific instruments.

PALLAS. See **Minerva.**

PALLAS, a small planet that has a position between Mars and Jupiter. It was discovered at Bremen by Olbers (q. v.) in 1802. The orbit is inclined to the ecliptic more than that of any other planet. The revolution around the sun occurs in 4.61 years. Estimates place the diameter at 300 miles. It was so named from Peter Simon Pallas, an eminent traveler and naturalist, who was born at Berlin, Germany, Sept. 22, 1741; died there Sept. 8, 1811.

PALMA (päl'mà), a city of Spain, on the southwestern coast of the island of Majorca, on Palma Bay, 132 miles south of Barcelona. The city is pleasantly situated, has a fine harbor, and is connected by railway with the principal trade centers of the island. Among the manufactures are cordage, woolen and silk goods, clothing, machinery, and utensils. Many of the buildings are of the Moorish style of architecture. The streets are regularly platted, intersecting each other at right angles. It contains a Gothic cathedral, an exchange, a governor's palace, three colleges, and a number of fine educational institutions. The city has a fine public library, a museum, several parks, and a number of modern municipal improvements. It has an extensive foreign and domestic trade. Population, 1920, 65,397.

PALMA, Tomas Estrada, first president of Cuba, born near Bayamo, Cuba, in 1835; died Nov. 4, 1908. His father owned large estates near Bayamo and gave him a careful education, including a course of law in the University of Seville, Spain. He joined the revolutionary army at the beginning of the Ten Years' War, in 1868, and by efficient service soon won the rank of general. The republican forces proclaimed the independence of Cuba and he was made president near the end of the war. However, he was taken captive by a detachment of Spaniards and kept a prisoner in Spain until the insurrection subsided, in 1878. On returning to Cuba he found his estates confiscated and his parents dead, owing to which he went to Honduras, where he served as postmaster-general. Subsequently he removed to Central Valley, N. Y., where he conducted a school in the Spanish language until 1895, when he organized the junta in New York City to give aid to the revolutionists in Cuba. Subsequent to the Spanish-American War, in 1901, he was chosen president of the new republic, and as such was inaugurated May 20, 1902, at which time the United States gave up all claim to jurisdiction over the new republic. In 1905, he was reëlected to the presidency. As chief executive he demonstrated wise statesmanship and gave encouragement to the development of industries and the extension of commerce. As a result of an insurrection, in 1906, he resigned the presidency, when the United States intervened to maintain the republic.

PALMAS (päl'màs), a cape on the western coast of Africa, forming the southern extremity of Liberia. It has a substantial lighthouse.

PALMER (pä'mẽr), a town of Massachusetts, in Hampden County, on the Chicopee River, fifteen miles northeast of Springfield. It is on the Boston and Albany and the Vermont Central railroads and has electric railway facilities. Palmer has waterworks, electric lights, and other municipal improvements. It has a growing trade in merchandise. Palmer was settled in 1716 and incorporated in 1775. Population, 1905, 7,755; in 1925, 11,044.

PALMER, Alexander Mitchell, public man, born at Moosehead, Penn., May 4, 1872. He was admitted to the bar in 1893, practiced law successfully, and in 1909 was elected to congress, serving until 1915. He was then appointed custodian of alien property in the United States by President Wilson. He entered the cabinet in 1919 as attorney-general to succeed Thomas W. Gregory.

PALMER, Alice Freeman, teacher, born in Colesville, N. Y., Feb. 21, 1855; died Dec. 6, 1902. She graduated from the University of Michigan in 1876, became teacher of Latin and Greek at Lake Geneva, Wis., and in 1879 was made professor of history in Wellesley College. Of this institution she became acting president in 1881, and the following year was chosen its president, serving in that capacity until 1887, when she resigned and married George H. Palmer, professor at Harvard University.

PALMER, Erastus Dow, sculptor, born in Pompey, N. Y., April 2, 1817; died March 9,

1904. He first learned the trade of a carpenter and then became a cutter of cameos, but in 1852 began to give his attention to sculpturing. He visited Italy and France in 1872, when he executed at Paris a statue of Robert R. Livingston, now in the hall of representatives at Washington. This work and several others were exhibited at the Centennial Exposition in 1876. Other productions include "The White Captive," "Indian Captive," "Landing of the Pilgrims," "Infant Flora," "Morning," "Evening," and busts of Hamilton, Irving, Perry, and other Americans. "The Angel at the Sepulchre," a large statue in the cemetery at Albany, N. Y., is counted one of his best works.

PALMER, John McAuley, statesman, born in Scott County, Kentucky, Sept. 13, 1817; died Sept. 25, 1900. His education was secured in the public schools, after which he studied law, and in 1840 was admitted to the bar of Illinois. He became State senator in 1852, and in 1860 was a Republican presidential elector. At the beginning of the Civil War he entered the service as colonel and commanded at New Madrid, Island No. 10, Farmington, and Stone River. He was Governor of Illinois from 1869 to 1873. Later he went over to the Democrats, and in 1891 was elected United States Senator. In 1896 he was the candidate for President of the National Democratic party, a division that was unfavorable to bimetallism, but he failed to carry any of the states. He received 133,148 of the popular votes.

PALMER, Ray, clergyman and author, born in Little Compton, R. I., Nov. 12, 1808; died in Newark, N. J., March 29, 1887. In 1830 he graduated from Yale University, was licensed as Congregational minister in 1832, and received a charge at Bath, Me. He remained in that city until 1850, when he was appointed pastor in Albany, N. Y. Union College conferred a degree upon him in 1852. In 1866 he became secretary of the Congregational Union in New York City, a position he held twelve years. Among his writings are the "Unlost Paradise," Earnest Words," "Closet Hours," and "Holy Communion." His many beautiful hymns include "My Faith Looks Up to Thee," which has been translated into numerous languages.

PALMERSTON (păm'ẽr-stŭn), **Henry John Temple, Viscount,** British statesman, born in Westminster, England, Oct. 20, 1784; died Oct. 18, 1865. He descended from a noble family and claimed descent from Edwyn, who lost his life in 1071 by opposing the Normans. Palmerston studied at the University of Edinburgh and in 1803 graduated from Cambridge. He was elected to Parliament from the Isle of Wight in 1807, when he was made one of the junior lords of the admiralty. Cambridge elected him to Parliament in 1811, and he held his seat until 1828, retiring at that time from the Wellington ministry on account of supporting Catholic emancipation. Later he was elected for several other districts, held the office of Foreign Secretary until 1841, and in 1846 became Foreign Minister. His policy met with marked opposition in the House of Lords, where a resolution of censure was introduced in 1850, but the House of Commons passed a vote of confidence, though not until after four days had been spent in debating that measure.

In 1852 he became Home Secretary and was made Prime Minister in 1855, but his ministry fell in 1858 on the question of approving the course pursued by the Emperor of France in relation to the refugees who had plotted again Napoleon. He returned to power in 1859 and remained the Prime Minister until his death. It was his ambition to extend everywhere the influence of Great Britain. During his public life occurred the Civil War in America, the war between France and Austria, the revolutionary movement of 1848, the Greek imbroglio of 1847-50, and the war between Austria and Prussia. His remains were buried in Westminster Abbey. His views are set forth in various addresses and in the parliamentary reports.

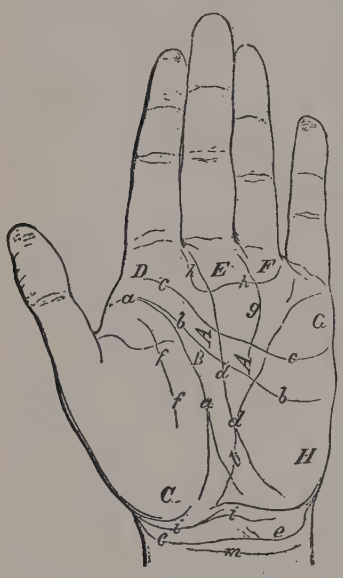
PALMETTO (păl-mĕt'tō), a class of palms which are indigenous to the United States. They are found abundantly in the Carolinas,

PALMETTO.

Florida, Georgia, and some sections of California. These trees include a number of allied species, some of which are widely distributed in the West Indies. The stem usually is rough with the bases of the old leafstalk turned

upward. The common palmetto attains a height of from thirty to fifty feet. The leaves are from six to ten feet long, and are terminal from a single bud. Palmetto wood is very durable under water. It is not attacked by the ship worm and serves a valuable purpose for piles and wharves. The leaves are woven into hats, and the buds of some species are eaten as a vegetable.

PALMISTRY (păl'mĭs-trў), or **Chiromancy,** the art by which some profess to be able to read, from the *palm,* the character and temperament of others and to discover past events and make predictions as to the future. This practice is based upon the lines and marks of the palm of the hand, usually the left, and some take into account the shape of the hand. Palmistry was regarded a science worthy of approbation by Aristotle. It was practiced by Emperor Augustus of Rome. The records of the Brahmans in India prove that it is of great antiquity. A Brahman caste called Joshi makes use of certain marks and features of the face and body in connection with those of the palm of the hand, and in a manual of palmistry published many centuries ago the art is fully outlined by illustrations and descriptions.



PALMISTRY.

AA, head line; *B,* triangle indicating heart; *C,* mount of Venus; *D,* mount of Jupiter; *E,* mount of Saturn; *F,* mount of the sun (Apollo); *G,* mount of Mercury; *aa,* life line; *bb,* line of nature; *cc,* abdomen; *dd,* liver and stomach; *ee,* the rascette; *ff,* secondary life line; *g,* line of honor; *hh,* line of affection; *ii,* marriage line; *m,* discrimination.

Among the prominent features of the palm on which the interpretation is based is included a curve from the basal joint of the forefinger round the thumb as far as the wrist joint, called the *line of life.* When this is deeply colored and variously marked by connected furrows, it is said to indicate a long and happy life. Fortune is indicated by a clear and unbroken line from the forefinger to the little finger, called the *line of fortune,* and the state of health is estimated by a line running across the hand, called the *line of health.* The prominent characteristics indicating traits of character include the fleshy projection at the base of the forefinger, called the *mount of Venus;* at the base of the thumb, the *mount of Jupiter;* of the middle finger, the *mount of Saturn;* of the ring finger, the *mount of the sun;* and of the little finger, the *mount of Mercury.* In like manner certain marks or eminences indicate other heavenly bodies. With each of these are associated the qualities common to the respective planets, which are said to be possessed by the individual. The mounts may be modified in their signification by other signs or lines, but they are said to indicate various traits.

Jupiter, when well developed, indicates ambition and pride; *Venus,* melody and love; *Saturn,* fatality; the *sun,* riches; and *Mercury,* science and wit. Those professing a knowledge of and belief in palmistry have striven to make it an exact science by detailing with claims of exactness every mark and indication of prominence, but the art has been consigned to obscurity by practically all students of educational and scientific arts.

PALM OIL (päm), a thick substance obtained from the fruit of several species of palms, but chiefly from the *oil palm,* a tree native to the western part of Africa. This tree has large pinnate leaves that grow in tufts and attains a height of thirty feet. The fruit is nearly two inches long and about an inch in diameter. The oil is obtained from the covering. It has a deep orange color when it is fresh and the odor resembles that of violets. The oil has the consistency of butter at a low temperature. The natives use it as an article of food, but it must be served when fresh, otherwise it develops a somewhat strong taste. Palm oil is used in making candles and for lubricating purposes. The oil palm is grown to some extent in South America, where it has been naturalized.

PALMS, an order of endogenous trees, occurring principally in tropical countries. They are characterized by tall and slender stems, which gradually diminish in size upward. Some of the species are of low growth, though most of them attain to a great height, often from 150 to 190 feet. The stem is without branches and at the top is a crown of large leaves. The largest leaves are borne by the fan-leafed palm. Others bear fern-shaped and pinnate leaves. The pinnate leaves of some species often measure thirty feet in length and from three to eight feet in width. Stems measuring from three to five feet in diameter are not rare. Humboldt placed the number of species at 600 and asserted that not a single species is found in which some good property does not exist. At present the entire group is classified into 130 genera and about 1,200 species.

Among the products of value derived from palms is the food secured from the stems when young. The *cabbage palm* yields an edible terminal bud and the *cocoa, date,* and other spe-

cies supply valuable fruit. A kind known as *sugar palm* yields a brown sugar and a sweetish sap from which a beverage is made. The *sago palm* is the source of the sago of commerce, the *wax palm* produces a juice from which wax is made, and the *fan palm* is valued for its foliage, which serves in the manufacture of fans and other useful articles. A tree known as the *doum palm* is native to Egypt. It has a trunk with two or more branches, and produces a fruit about the size of an apple, which tastes somewhat like gingerbread and is eaten by the

COCOANUT PALM.

A, Branch with flowers; *B*, male flower; *C*, female flower, D, fruit with the shell opened.

natives. The wood of many species is valuable for its strength, and the bark serves in making cordage. Palm trees are found in abundance in South America, the West Indies, the East Indies, and the tropical regions of Asia and Africa. The fruit of many species is acrid and some yield a kernel from which vegetable ivory is prepared, resembling somewhat the coquilla nut. See **Cocoanut; Date; Palmetto,** etc.

PALM SUNDAY, the Sunday before Easter, being the last Sunday in Lent and the first in Holy Week. It was so named in commemoration of Christ's entry into Jerusalem, when palm branches were strewn before Him. The feast of palms was observed in the East as early as the 5th century, and later it became an occurrence of the Roman and Greek Catholic churches. It is the practice in these churches for the priest to bless the palm branches carried by worshipers, and as they pass out festival hymns are sung. When the participants return home, the branches are preserved and their ashes are used in celebrating Ash Wednesday.

PALMYRA (păl-mī'rà), a city of ancient Syria, located 145 miles northeast of Damascus, where its ruins are still to be seen in an oasis. Solomon is thought to have founded the city in the 10th century B. C., and in his time it became an important stronghold of the Hebrew kingdom. The immediate vicinity of the city consists of a fertile and well-watered tract of land abounding in palm trees, but surrounding it at a distance are either sandy tracts or barren mountains. It continued to develop importance throughout the period of ancient history. In the early part of the 3d century A. D. it became the center of an empire under Odenathus, which included both Syria and Mesopotamia. Emperor Aurelian, of Rome, conquered it in 275, and the Saracens destroyed it in 744, but its ruin was completed by Tamerlane in 1400. The site is at present occupied by an Arabian village called Tedmor. Many interesting ruins have been found here by modern explorers, among them the remains of a temple of Baal, a number of monuments, and numerous relics bearing inscriptions in the Aramaic language. Among the recent discoveries are many Corinthian columns and tomb towers. The latter date from a period immediately preceding the Roman conquest and have inscriptions in the Syriac.

PALO ALTO (pä'lō ăl'tō), a town of California, in Santa Clara County, on the Southern Pacific Railroad, 32 miles southeast of San Francisco. The surrounding country is agricultural and fruit growing, yielding large quantities of cereals, fruits, and grasses. It has a fine climate and a beautiful location. The town is noted chiefly as the seat of the Leland Stanford Junior University (q. v.). It has well-graded streets, systems of waterworks and electric lighting, and a Roman Catholic theological seminary. Population, 1920, 5,900.

PALO ALTO, a Spanish term meaning tall timber, the name applied to the first important battle of the Mexican War. It occurred in the forests about eight miles northeast of Matamoros, on May 8, 1846. The Americans under General Taylor had an army of 2,300 and the

Mexicans under General Arista had about 6,000. This battle covered a period of five hours and the Mexicans were defeated, but they retreated in fairly good order. The Americans lost seven killed and forty wounded, and the Mexican loss in killed was about one hundred. General Arista retreated to Resaca de la Palma, where he was defeated a few days later.

PALPITATION (păl-pĭ-tā'shŭn), the name applied to unusually forceful pulsations of the heart, causing a troublesome and unpleasant sensation. It frequently arises from sudden emotion and stomachial and other disorders, but may be due to organic disease of the heart. Diseases of the stomach have a double effect upon the heart, in that they influence through the nervous system by reflex action and exercise pressure in case of flatulence. Stimulants, such as coffee, tobacco, and alcoholic liquors, when used excessively, are prolific causes of palpitation of the heart. Careful dieting, regularity in meals, and wholesome rest should accompany the treatment, which depends largely upon the direct cause.

PAMIR (pä-mēr'), an elevated mountain region of Asia, situated principally in the southern part of Turkestan, formed by a union of the extremities of the Himalaya, Hindu-Kush, and Thian Shan Mountains. The region includes 30,000 square miles. It has a general altitude of 13,000 feet above sea level, this elevation giving it renown as the "roof of the world." The region has great extremes of heat and cold, with a rainfall barely sufficient to produce vegetation for the herds of cattle and sheep pastured there by the Kirghiz herders. Animal and bird life is quite abundant, and caravan routes have crossed it for many centuries. Lake Sarikol and other small sheets of water are in the region. A number of rivers have their source in the Pamir, including the Oxus.

PAMLICO SOUND (păm'lĭ-kō), an inlet from the Atlantic Ocean, extending a distance of 75 miles along the eastern coast of North Carolina, having a width of from 15 to 25 miles. It is separated from the Atlantic by a number of long and narrow islands of sand and is connected with Albemarle Sound by Croaton Sound. The Neuse and Tar rivers flow into it. A large part is shallow, but the southern portion has a general depth of twenty feet. The shores are mostly low. It may be reached by vessels from the ocean through Hatteras and Ocracoke inlets. In many places are tracts covered by bulrushes and other aquatic plants. Bird and fish life is abundant.

PAMPAS (păm'pàs), a name applied to the vast open, treeless plains in the region of South America which lie south of the Amazon, but situated principally in Argentina, Bolivia, and Paraguay. The pampas of Argentina are the most extensive and cover a vast region in the central part, including about 1,000,000 square miles. It rises in the form of terraces from the Atlantic to the Andes. The character of these plains with regard to climate and vegetation is diversified, some parts forming fertile tracts and others being excellent grazing land, while a portion is barren and sandy. In the pampas are many lakes and swamps, including Lake Chiquita, in the center of Argentina. Vast herds of cattle, horses, and sheep are kept on the pampas. Large tribes of Indians and wild horses and cattle are still numerous in some sections. Many species of grasses are abundant, supplying fine pasturage and native plants suitable for hay.

PAMPAS GRASS, a tall, ornamental reed-like grass native to the pampas of South America, but now cultivated for ornamental purposes in many countries of America and Europe. It has long, narrow, and rigid leaves, much crowded at the base, naked culms with large spikes of whitish flowers, and male and female organs on separate stalks. Usually the leaves attain a length of from three to six feet,

PAMPAS GRASS.

and the flower stems are from eight to twelve feet high. The flower plumes are used for decorative purposes by florists. Several species have been described, differing mainly in the flowers, which are purple, yellow, or variegated with white. Pampas grass is grown commercially in California, where it was introduced in 1880.

PAMPHLET (păm'flĕt), a small booklet or circular, consisting of several leaves fastened together by stitching. Printed pamphlets were distributed extensively in the reign of Henry VII. and other sovereigns of England, especially in the time of the struggle between the Protestants and Catholics. Those who prepared

and published such printed matter were known as *pamphleteers*. It was a convenient and effective way of placing religious teachings into the hands of the people, especially at a time when newspapers and magazines were not published extensively. Such English writers as Defoe, Swift, and William Prynne added greatly to literature by the publication of pamphlets. Germany had a large number of pamphleteers, including Luther, Erasmus, and Melanchton, who issued many pamphlets to disseminate and promote their religious views.

PAN, the Grecian god of fertility, who presided over all rural occupations and was the special patron of shepherds and huntsmen. He was regarded the son of Hermes and Callisto. At birth he had small horns sprouting from his forehead, pointed ears, a goat's beard, and the tail and feet of a goat. The name of Pan was given to him because as a youth he delighted his associates with many antics and his peculiar and grotesque form. The Greeks looked upon him as possessing the power of prophecy and skill in music, and regarded him the inventor of the Pandean pipes, or syrinx. Milk and honey were usually offered to him in sacrificial worship, but rams, lambs, and cows were more commonly sacrificed. The Romans had a divinity called Faunus, whom they identified with the Greek Pan, and ascribed to him the gift of prophecy, protection against wolves, fertilization of the soil, and the instigation of bad dreams and evil apparitions. The satyrs were his attendants. Pan is celebrated in literature, being mentioned by Schiller, Milton, Rabelais, and Mrs. Browning.

PANA (pā'nà), a city of Illinois, in Christian County, 42 miles southeast of Springfield. It is on the Illinois Central, the Baltimore and Ohio Southwestern, and the Cleveland, Cincinnati, Chicago and Saint Louis railroads. The surrounding country contains deposits of coal and fertile soil. Among the manufactures are flour, cigars, tobacco products, and machinery. It has a public library, waterworks, sanitary sewerage, and several fine school and church buildings. The place has a considerable trade in grain, minerals, and merchandise. It was settled in 1853 and chartered as a city in 1870. Population, 1900, 5,530; in 1920, 6,122.

PANAMA (păn-à-mä'), a seaport city and the capital of Panama, on the southern coast of the Isthmus of Panama, connected with Colon, a city on the Caribbean Sea, by railway. It is finely situated at the head of the Bay of Panama, on which it has a secure harbor. The houses are mostly of stone, built in the Spanish style. Among the noteworthy buildings are the general hospital, the Jesuit College, the cathedral, several public schools, and a number of convents. The surrounding country is devoted largely to agriculture and stock raising. Shells, pearls, gold dust, and many species of fish are obtained in the vicinity.

The prosperity of Panama dates from 1855, when its railroad connection with Colon, about 48 miles distant, was completed. Since then a large amount of freight has been transported across the isthmus instead of shipping by way of Cape Horn. It suffered much from disastrous fires in 1864 and 1874. Population, 1908, 31,248; in 1922, 61,128.

PANAMA, a republic of Central America, consisting almost entirely of the Isthmus of Panama. It is bounded on the north by the Caribbean Sea, east by Colombia, south by the Pacific, and west by Costa Rico. At the narrowest place it is 30 miles wide, but the greatest width is 118 miles, and the length from east to west is 420 miles. The area is 31,570 square miles.

Description. The greater part of the surface consists of low mountains and hills, ranging from 200 to 1,500 feet above the sea, and a large part is covered with dense forests. Although the chains and ridges are more or less systematic, they are distributed very irregularly. Near the border of Costa Rico, not far from the Pacific shore, are highlands of a lofty character, such as Pico Blanco and Chiriqui, both over 11,000 feet high. No well-defined watershed characterizes the country, but the drainage is divided almost equally between the two oceans. Deep valleys have been cut almost to the level of the sea, in which the drainage is carried by short and somewhat rapid streams.

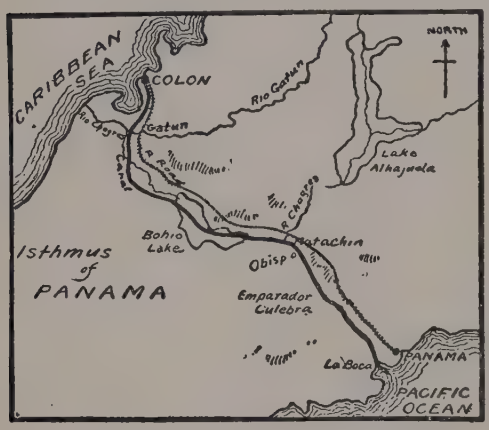
The climate is healthful and agreeable in the highlands, but it is unfavorable to those who are not acclimated in the lower districts and valleys. Much of the soil is fertile and the rainfall is abundant. Between December and April the entire country is influenced by the northeast trades, which are replaced by southeasterly winds the remainder of the year. The annual temperature is about 79°, but is somewhat higher on the Atlantic than on the Pacific coast, owing to the warm waters of the Caribbean. The temperature seldom falls below 60°, but is lower on the highlands, and the highest registration is from 95° to 102°.

Resources. The country has deposits of gold, iron, copper, salt, coal, building stone, and commercial clays, but mining has not been developed materially. Primeval forests still cover a large part of the surface, yielding indigo, rubber, lumber, and caoutchouc. Jungles, sedges, wild plantain, and grasses are abundant. The pearl fisheries are valuable, especially at the Pearl Islands and in the Gulf of Panama.

Industries. Farming is the principal occupation. About 85,500 acres are under cultivation, of which nearly one-half is devoted to growing fruit, especially the banana and the cocoanut. Coffee, sugar cane, rice, corn, yams, and sweet potatoes are grown profitably. The country has large interests in cattle, horses,

mules, swine, sheep, and goats. Large quantities of salt are produced, but this enterprise is leased to private persons as a government monopoly. Other manufactures include pipe tobacco, cigars, earthenware, hats, and clothing.

COMMERCE AND TRANSPORTATION. The larger part of the trade is with the United States. Among the exports are hides, bananas, India rubber, lumber, and cabinet woods. Cotton goods, breadstuffs, boots and shoes, and machinery are imported. Commercial relations of considerable importance are maintained with Germany, Great Britain, and France. A railway line extends across the country from the



Map to show the Panama Canal and the Panama Railroad.

Atlantic to the Pacific, having a length of 47 miles. This line connects Panama and Colon, consists of a double track, and is owned and operated by the government of the United States. Other railways are operated from the coast to plantations a short distance inland. In general the highways are not well constructed, but good macadamized roads are maintained near the larger towns.

GOVERNMENT. The country is governed under a constitution which was adopted in 1904. It vests the chief executive authority in a president, who is elected for four years and cannot serve two terms in succession. The chamber of deputies consists of 32 members, elected for four years according to the number of inhabitants. Each of the seven provinces has a governor, who is appointed by the president. The gold balboa, equal to $1.00 in the money of Canada and the United States, is the monetary unit. Silver coins, known as pesos, equal to fifty cents, are in general circulation.

Although the larger towns have elementary and secondary schools, education is not well advanced. The capital has two normal schools, a school of commerce, and two high schools for boys and girls. A number of students are educated in Europe at the expense of the government, being fitted to become instructors of higher courses, after which they are employed in the institutions as teachers on a salary. The government has a well-defined policy of teaching the leading industries, such as fruit growing, hat making, and agriculture.

INHABITANTS. The inhabitants consist largely of mixed races, comprising Spanish, Indians, and Negroes. Temporary immigrants from the United States, Germany, and Spain are quite numerous. A large number of Chinese laborers are employed. Panama, on the Pacific coast, is the capital and largest city. Colon, or Aspinwall, Montijo, Agua Dulce, and Puerto Mudis are commercial centers. Population, 1922, 420,108.

HISTORY. The territory comprised in Panama was a part of the Spanish colony in South America until 1821, when the inhabitants proclaimed their independence and became incorporated with the then powerful republic of Colombia, which country had embraced the presidency of Quito, the viceroyalty of New Granada, and the Dominion of Venezuela.

The object of declaring independence of the government of Spain was to improve administrative conditions, hence the republic of Colombia was founded in a region that formerly comprised all of the territory of Northern South America. This republic was bounded on the south by Brazil and Peru and on the east by Guiana. In 1831, when the great republic of Colombia was dissolved, the territory was divided and in its stead were established the three republics of Venezuela, Equador, and New Granada.

At that time the Isthmus of Panama was incorporated as a part of New Granada, and in 1832 a constitution was adopted which established a system of centralized government. The greater number of the provinces of New Granada engaged in a civil war in 1841, denounced the constitution, and instead of the centralized government proclaimed a federation of states, giving the several divisions larger power in local government. At that time the provinces of Panama and Veragua, which then comprised the Isthmus of Panama, proclaimed independence and erected a sovereign state. A convention was called on March 18, 1841, when the territory embraced in the isthmus was organized as the Republic of Panama, and it was declared to be the intention of the people never again to allow the republic to be incorporated with New Granada under the constitution that centralized the government in the nation at the expense of individual states. However, the congress of New Granada began to favor a form of federal organization and the state of Panama was again united with the mother republic. This system of government was carried on successfully until the Civil War of 1885, when the congress and president of Colombia substituted an absolute central government in its place, assuming that such

a change was to the interest of the perpetuity of the nation.

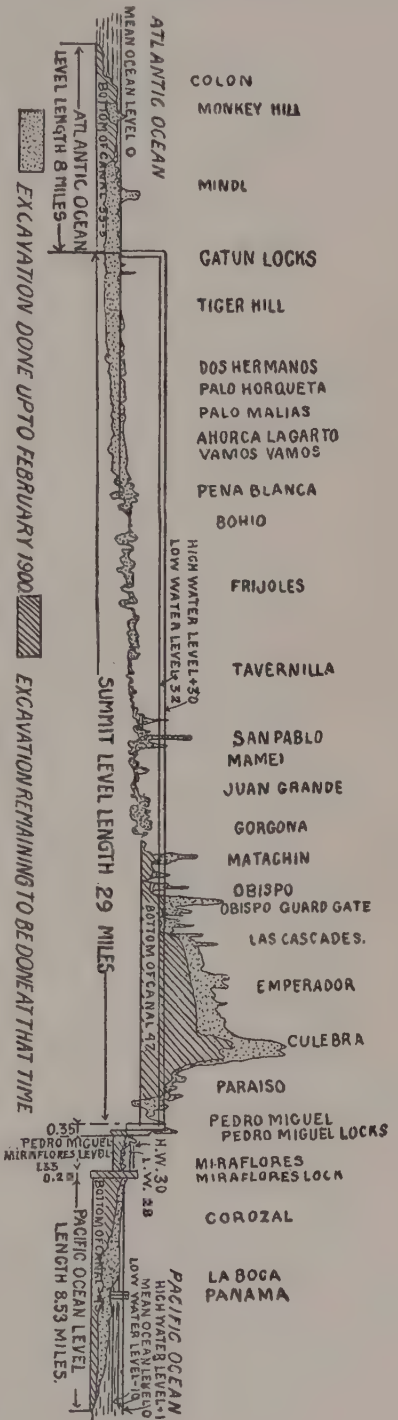
The territory embraced in the Republic of Panama includes practically all of the region that will be benefited locally by the construction of the Panama Canal, hence its inhabitants were firm in their support of this canal project. Both the president and congress of Colombia favored granting a right of way across the isthmus, but they decided to profit by asking for an unusually large concession in the payment of money. When the Congress of the United States, in 1903, formulated the Panama Canal Treaty, it was rejected by the government of Colombia, and this course on the part of the South American republic brought about a revolution in Panama. The revolutionists set up a new republic, which was recognized by the United States on Nov. 7, 1903, and Manuel Amador was elected president.

The Panama Canal Treaty with the United States was ratified on Dec. 2, 1903. In 1917 the country declared war against Austria and Germany.

PANAMA, Isthmus of, a narrow neck of land which connects North and South America, separating the Atlantic Ocean from the Pacific Ocean. It is from 30 to 65 miles wide, and the principal part of it is included in the republic of Panama, formerly a division of Colombia, which has an area of 31,570 square miles. A range of mountains, which rises to altitudes of 11,000 feet in the western part, traverses the isthmus. It has many small rivers that afford excellent drainage. The isthmus is crossed by the Panama Railroad and the Panama Canal.

PANAMA CANAL, an Isthmian canal in Central America, extending from Colón, on the Atlantic, to Panama, on the Pacific, a distance of about 47 miles. The canal properly begins in the Bay of Limón, a mile northwest of the city of Colón, with a channel 500 feet in width and 41 feet in depth at mean tide, running due south to the shore line of the Bay of Limón, at the mouth of the Mindi River. This distance is a little less than five miles. Then the canal passes through low and swampy ground in a southerly direction three miles to Gatun, the width of this stretch being 500 feet and the depth, 35.5 feet. Vessels entering the canal from the Atlantic side proceed at sea level for a distance of eight miles to Gatun, where a twin flight of three locks lifts them to the summit, 85 feet above the sea. For the next 23 miles navigation is on the artificial Lake Gatun, to the Obispo Guard Gate. Six miles farther is the continental divide, pierced by the so-called *Culebra Cut,* the excavation of which is the heaviest on the entire line. The original surface at this point ranged from 334 to 600 feet above sea level.

Descent to the Pacific is begun by the Pedro Miguel Locks, by which Sosa Lake is reached. This body of water, as well as Lake Gatun, is an artificial lake, the surface of which is 55 feet above the sea and which affords navigation for several miles with very little excava-



PROFILE OF THE PANAMA CANAL.
Showing excavations by the French and the Americans.

tion. Sea level is reached through the Miraflores Lock, two locks in flight at the Pacific terminus of the canal line. The distance from deep water in the Caribbean Sea to deep water in the Pacific is about 50 miles.

The locks are in duplicate and are constructed of such size as to permit the passage of the largest ship afloat. They were designed to accommodate ships which are 800 feet long and have a beam of 88 feet. These dimensions are approached only by the largest vessels in actual use, such as the *Lusitania* and the *Kronprinzessin Cecile*. Larger vessels than these can enter only a few of the harbors of the world and it is probable that a great many years will elapse before vessels of this size are at all common in any but fast passenger service.

Gatun Lake, an artificial body of water, is formed by damming the valley of the Chagres River at Gatun. It has an area of 171 square miles, a total length of 30 miles, and an elevation of 85 feet above the sea, but only 23 miles will be navigated by ships crossing the isthmus. By it the waters of the Chagres are stored to furnish a supply for the operation of the locks, as well as for a long stretch of inland navigation. The lake likewise enters into service as a reservoir for the great floods which at times sweep down the river valley, which waters of these floods are stored in the lake, and the surplus is discharged at a moderate rate through suitable spillways into the river below. The dam is 135 feet high, one and a quarter miles long, and a half mile thick at the base. Sosa Lake is formed by the construction of other small dams in the valley of the Rio Grande. At the Obispo Guard Gate, near the northernmost point of the Chagres valley, a dam may be constructed in future years for additional storage of water. From the Miraflores Lock to the curve in the Bay of Panama, a distance of four miles, the channel is 300 feet wide at the bottom and 45 feet deep below mean tide. Colón and Panama, on the Caribbean and Pacific coasts, respectively, are the only cities of considerable size at present on the route of the canal.

Panama Canal Zone. In 1904 the United States acquired a tract of land which extends from the Caribbean Sea to the Pacific Ocean, being tributary to the Panama Canal. This possession is traversed by the Panama Railroad and the Panama Canal. The area is 474 square miles. It is under the government of the Department of Civil Administration. For the purpose of local administration it is divided into administrative districts, which have charge of certain administrative functions. Much has been done to improve the sanitation by drainage and enforcing a system of rules of health. This vigorous action on the part of the government has greatly reduced the death rate and prevented the spread of yellow fever and malaria. Several hospitals and a number of elementary and secondary schools are maintained by the government. Another improvement of note is the rebuilding of the Panama Railroad, which has been converted into a first class line, and a large amount of new equipment has been provided. The traffic on this line continues to yield good returns to the government.

Utility of Canal. The Panama Canal may well be considered the most important public improvement in the Western Hemisphere, probably in the world. It will ultimately surpass the anticipation of those who were its most devoted advocates, since it will open an ocean route of travel of much greater importance than the Suez Canal. Although it will have strong competition in many transcontinental railway lines, the greater utility will consist of furnishing a direct route from ocean to ocean for a vast interoceanic trade. Considered from a national point of view, as regards both Canada and the United States, it will permit the passage of a large traffic between the coasts of the Atlantic and the Pacific.

History. The region traversed by the Panama Canal was first explored by the Spaniards in 1527. Although an isthmian canal had been considered possible for more than three centuries, the majority of advocates favored the Nicaraguan route, thereby utilizing Lake Nicaragua. Von Humboldt first suggested the Panama Canal in 1803. The railroad across the isthmus from Colón to Panama was completed in 1855. De Lesseps formed the Panama Canal Company in 1879 and began work two years later, but the enterprise failed in 1888. A new French canal company was formed in 1894, but De Lesseps died the same year, which forced an abandonment of active operations. In 1901 the Hay-Pauncefote Treaty was signed, which was soon after ratified both by Great Britain and the United States.

The United States purchased the French holdings in the canal in 1903, paying $40,000,000, and negotiations were conducted in the meantime with the view of concluding a treaty with Colombia. In the same year, owing to the dilatory action on the part of the Colombian government, a revolution occurred in Panama, which resulted in the organization of the Republic of Panama. That country concluded a treaty with the United States, ratifying it in 1904, in which year the canal property was transferred to the United States. The first work consisted of sanitating the isthmus, providing suitable quarters for the employees, and establishing and equipping hospitals. Active operation in excavating began early in 1905, for which purpose the most modern and substantial machinery was put into service. The French expended a total of $200,000,000 and completed less than one-third of the work, the principal excavations being shown in the profile. However, the United States authorities did not utilize all of their

excavations, since the construction of the Gatun Dam changes the original plan. The canal was completed in 1914 at a total cost of $375,000,000 and was opened for traffic Jan. 1, 1915.

PANAMA CONGRESS, a meeting of the delegates from the nations of America at the city of Panama in June, 1826, to consider questions of general interest. Simon Bolivar, president of Colombia, advocated the formation of a confederacy of the American states, and in 1823 invited the governments of Chile, Mexico, Peru, and other countries to empower delegates with authority to take such action. This effort having failed through a lack of coöperation, he issued a second circular and sent it to all the republics of Spanish-America and the United States. The purposes, as announced in advance, were to consider the slave trade, the establishments of republics in Cuba and Porto Rico, the recognition of the new republic of Haiti, and other topics of common interest. President Adams accepted the invitation, but it precipitated an extended debate in Congress, although Richard C. Anderson and John Sergeant were finally appointed as envoys extraordinary. The congress met on June 22, 1826, and, after holding ten sessions, agreed upon a treaty of perpetual alliance against Spain. It adjourned to meet at Tacubaya, Mexico, the following year, but the meeting was never held. The United States was not represented at the meeting at Panama, since Anderson died en route and Sergeant was delayed and did not reach Panama until after the congress had adjourned.

PAN-AMERICAN CONGRESS, a conference of representatives from the republics of America, which convened at Washington on Oct. 2, 1889, for the purpose of formulating plans for furthering American trade and establishing an American customs union. The plan of holding a Pan-American congress was originated by Henry Clay, but nothing definite was done until James G. Blaine agitated such an enterprise. The nations entitled to representation included the republics of the United States, Mexico, Central and South America, Santo Domingo, and Haiti. An adjournment was taken immediately after convening for the purpose of visiting different sections of the United States before commencing work. The congress began its deliberations on Nov. 19 of the same year and continued in session for five months, adjourning April 19, 1890. Among the different recommendations for commercial reforms suggested for adoption by the various governments are included reciprocity treaties by all the countries, a uniform commercial coinage, a uniform system of weights and measures, and a general plan of legalizing documents. The projects discussed without definite recommendation include the passage of uniform laws authorizing patents and copyrights, subsidies to steamship companies, extradition treaties, and the establishment of an international bank. The Bureau of American Republics was established at the suggestion of this convention.

The second Pan-American Congress was held at the City of Mexico from Oct. 22, 1901, until Jan. 31, 1902. It followed the general plan of the previous congress and in addition recommended a plan for international arbitration, the connection of North and South America by railway, and uniformity in the adoption of a standard money. The third Pan-American Congress met at Rio de Janeiro, Brazil, in July and August, 1906, at which the nations of both continents were well represented. It discussed the Draco Doctrine, which is to the effect that the nations of Europe are not to be permitted to collect debts from the countries of South America by forcible means. This question was referred to the Hague Peace Conference. The United States was represented by Elihu Root, then Secretary of State.

PANAY (pä-nī′), an island of the Philippines, located near the center of the archipelago, separated from Mindoro by the Mindoro Sea. It ranks fifth in size among the Philippines, having an area of 4,752 square miles, exclusive of the dependent islands and islets. The eastern and northeastern coasts have many small bays and sounds, but the other shores are indented by few inlets. Guimaras, located between Panay and Negros, is the largest dependent island, having an area of 243 square miles. The surface is mountainous, some of the peaks exceeding 5,000 feet, but the coasts and valleys are highly fertile. Many streams supply the drainage, including the Panay River in the north, the Cidián in the west, and the Jalaur in the southeast. Fine forests are abundant and the climate is favorable and healthful.

Agriculture is the chief occupation and sugar, rice, copra, and live stock are the principal products. Indigo, coffee, cotton, tobacco, pepper, and fruits are grown. Carabaos, horses, and sheep comprise the leading kinds of live stock. Mining has not been developed extensively, but the island has deposits of coal, iron, gold, gypsum, and marble. The manufactures consist chiefly of clothing and fabric, and these as well as raw cotton, tobacco, rice, and spices are exported. A number of insurrections against the authority of the United States took place after the Spanish War, and the island was not fully pacified until the surrender of General Delgado in 1901. The inhabitants are mostly Visayans, but include a small number of Mundos and Negritos. For local government the island is divided into three political districts, those of Iloilo, Cápiz, and Antique. Iloilo is one of the principal ports and was occupied and garrisoned by the United States during the war with Spain. Population, 1922, 801,887.

PANCREAS (păn′krē-ăs), a gland in the human body, located back of the stomach, extending across the posterior wall of the abdomen. It varies from six to eight inches in

length, is about an inch and one-half wide, and has an average thickness of about an inch. In the adult it weighs about three ounces. The pancreas communicates with the intestines by a small duct, through which its secretion, called the *pancreatic juice,* enters into the duodenum. This secretion is colorless, viscid, and remarkable for acting upon all the principles of the food. It converts starch into grape sugar, proteids into peptones, and fat into a soap or emulsion. The pancreas is found in all birds, reptiles, mammals, and some fishes. It is subject to few diseases, but ailments and wounds are usually fatal.

PANCREATIN (păn'krē-à-tĭn), a digestive ferment used extensively in medicine. It is extracted from the pancreas of swine that are killed about six hours after a full meal, at which time that organ is highly active. The color of the extract is yellowish and it has a peculiar odor and taste. It contains four pancreatic ferments: *amylopsin,* which converts starches into sugar; *trypsin,* a digester of proteids; *steapsin,* which splits up and emulsifies fat; and a *milk-curdling ferment.* Pancreatin is the most useful of the digestive ferments administered by physicians, since it has the property of peptonizing foods.

PANDA (păn'dà), a carnivorous quadruped found in the Himalayas and in northern India. It is about the size of a large cat and belongs to the raccoon family. It has long, reddish-brown fur and a long, ringed tail. The food consists of birds, large insects, and small quadrupeds, which it catches by frequenting trees, where it dwells chiefly. The fur is considered of value commercially. These animals agree in many respects with the civets and have been classed with them by some writers. The natives call them *wah,* from the cry.

PANDORA (păn-dō'rà), an individual mentioned by Hesiod in Greek mythology as the first woman. It is related that she was formed out of clay by Vulcan at the request of Jupiter, who designed her for the purpose of punishing Prometheus, because the latter had stolen fire from heaven and brought it to earth. The gods immediately vied in making her presents. Mercury bestowed on her a smooth and persuasive tongue, the Graces made her fascinating, Minerva gifted her with the possession of feminine accomplishments, and Aphrodite gave her beauty and the art of pleasing. She was named Pandora because she possessed all gifts necessary to make her charming and irresistible. The gift from Jupiter was a box filled with unconquerable evils, which was intended for Prometheus, but his brother, Epimetheus, became charmed by Pandora's beauty and accepted it as a present. On opening the box all the ills and diseases that now afflict mankind escaped. However, hope lay at the bottom, and before it could escape Pandora hastily closed the lid. It is due to her that hope is preserved to man as a never-failing solace. Although many ills confront him in every walk of life, hope springs eternal in the human breast.

PANIC (păn'ĭk), a commercial crisis, such as may result from excessive speculative enterprises, unusual and harmful legislation in relation to finances and industries, or an extensive failure of crops. A panic is attended by overpowering alarm in financial and commercial circles. In that case a sudden run commences on the banks, the prices of securities fall, and other abnormal commercial conditions ensue. Among the panics of most note in Europe since 1750 are the following: The panic of Holland in 1773, which was attended by failures exceeding $50,000,000; the panic of England in 1793, resulting from the French War, when the government issued $25,000,000 exchequer bills; the panic of England in 1825 and 1826, resulting from speculations in the colonies, when 770 banks failed, and many families were required to live on bran; and the panic of England in 1847, owing to excessive railroad speculation, when the failures amounted to $100,000,000 and the rate of discount was 13 per cent. The financial crash in Australia, in 1892, had an unusually depressive effect upon trade.

The most noteworthy panics of the United States begin with that of 1819, which resulted from speculation that followed the War of 1812. In 1837 a panic was caused by a number of years of extraordinary speculation, when a large amount of business was transacted on the credit system under an inflated currency, and with an increase of population and a reduction of the volume of money per capita debtors were unable to meet their obligations. At that period State banks were established, from which currency was issued that later depreciated in value, which afterward became known as *wild-cat money,* and the mode of doing business was called *wild-cat banking.* The panic of 1873 resulted from another period of inflation of the currency during the Civil War and from legislation partially destroying the monetary functions of silver. In 1893 a widespread panic occurred, in which strikes, runs on banks, and other business disturbances were common. This panic is generally assigned to a variety of causes, including poor crops, unsound financial legislation, and the unwholesome effect on the American markets because of a large production of crops in other continents.

The panic of 1907 was due to several causes, none of which would by itself have produced widespread depression. A concerted line of prosecutions of illegal combinations of corporations in the administration of President Roosevelt is generally assigned as a prolific cause. Other causes include the distrust aroused by anti-trust legislation, an inelastic currency, a reduction in the standard of value by an increased production of gold, unusual speculation, and legislation to limit the rates charged by

railroads. The failures in business in 1922 were reported at 22,415, involving liabilities of $649,848,000. Canada had 1,387 failures in five years, ending in 1922, with a commercial loss of $27,221,259.

PANORAMA (păn-ō-rā'mȧ), the representation of a landscape as seen from one point, either in a painting or a photograph. The chief difference between a painting and a panorama is that the former aims at artistic effect and presents only part of the landscape, while the latter gives an entire view as seen from one position. A famous panorama of the siege of Paris during the Franco-German War was exhibited in 1875. Another noted production of this kind is the panorama of the Battle of Gettysburg, completed in 1888 and exhibited a number of years in New York City. Productions of this kind are numerous at present and may be seen in many art galleries.

PANSY (păn'zy). See **Violet**.

PANTHEISM (păn'thē-ĭz'm), a form of religious philosophy that holds God and the universe to be identical, which regards mind and matter as the manifestations of one universal being. It assumes the identity of cause and effect. Accordingly, a conception of the Deity is obtained by reasoning in relation to the individual and the objects that surround him. Pantheism had many adherents among the philosophers of Greece, including Anaximander, Pythagoras, and Xenophanes. It is still widely accepted by many of the educated Brahmans and enters largely into the religious thought of Egypt, Persia, Hindustan, and other countries, in all of which religious systems prevail that partake of pantheistic forms. Christians generally identify pantheism with atheism. Spinoza is the most noted modern representative of this dogma, and his writings, though largely misunderstood, give marked evidences that he held to many of the main tenets of pantheism.

PANTHEON (păn-thē'ŏn), a name applied to several important temples dedicated to the purposes of religious worship, as the Pantheon at Rome and the Pantheon in Paris. The *Pantheon at Rome* was built by Agrippa, son-in-law of Augustus, about 27 B. C., and was dedicated to Mars in memory of the victory obtained by Augustus over Antony and Cleopatra. Emperor Phocas gave it to Pope Boniface IV. in 609 A. D., who dedicated it to the virgin and holy martyrs, and Gregory IV. dedicated it to all the saints in 830. This structure has a circular form, is 188 feet in diameter and 212 feet high, and has a dome extending 36 feet above the upper cornice. It is now known as the Church of Santa Maria Rotonda. Within its walls many famous men have been buried. The *Pantheon in Paris* dates from 1761. It is a beautiful structure and for some time has been known as the Church of Saint Geneviève. In it are buried many men of eminence, among them Voltaire, Lagrange, Lannes, and Rousseau.

PANTHER (păn'thĕr), an animal of the leopard family, but exceeding the leopard in strength and size. The body is nearly six feet long without the tail, and the height at the shoulder is three feet. The general color is yellow, with a number of rings and spots on the sides. Like the leopard, it is a carnivorous mammal, feeding on birds and small quadrupeds. The puma of America is known as a panther, and the cougar of North America and the jaguar of South America are designated as such by some writers.

PANTOMIME (păn'tō-mīm), an entertainment or theatrical performance in which the action is represented by gesticulation, without the use of words. Actors who presented performances of this kind were common in ancient Greece and Rome, but the art of presenting pantomimic entertainments reached its greatest perfection in the latter country, especially in the time of Augustus. In dress and manner of action the Roman performer very closely resembled the modern ballet dancer, regulating his movement by the accompaniment of the flute or some other musical instrument. Every part of the body was used in acting, except the face, which was covered by a mask suitable to express the action of the piece. At first only one actor took part in the performance at the time, but later several acted together, and subsequently women were permitted to take part in the performances. The pantomimic exhibitions were characterized as licentious by the early Christian writers and for some time fell into disuse, but they were later revived in a more refined and cultured form and applied to Christmas and other entertainments.

PÁOLI (pä'ō-lē), **Pascal de**, patriot of Corsica, born near Morosaglia, in Corsica, in 1726; died near London, England, Feb. 5, 1807. He received a liberal education at Naples, where he was taken by his father in 1739 after an unsuccessful insurrection of the Corsicans against the Genoese. Later he returned to Corsica, where he was chosen leader of the revolutionary forces in 1755, but, when success was about to be secured under his able leadership, the Genoese sold the island to France, in 1768. He continued to lead the movement for independence against France, but was compelled to yield, and for safety settled in England, where he was supported by a pension. The revolutionary party of France recalled him to Corsica in 1789, when he became lieutenant general, but in 1792 he conceived the plan of making Corsica an independent republic. This course alienated the Bonaparte family, but he formed an alliance with Great Britain, and in 1794 surrendered the island to George III. Two years later he was compelled to leave the island by the displeasure manifested by his countrymen on this account. In 1796 he took up his residence near London, where he was supported by a pension under the British.

PAPAL STATES, the name of a territory in the central part of Italy, before that country was unified to form the present kingdom, sometimes called the States of the Church. These states extended from the Adriatic to the Mediterranean. They were bounded on the south by Naples and on the west and north by Modena, Tuscany, and Austria. They comprised an area of 16,000 square miles and a population of 3,124,668. The temporal government was under the Pope, who had both his spiritual and temporal capital at Rome. Several revolutions broke out in the Papal States during the early part of the 19th century, in which France and Austria became involved, and in 1848 the Pope fled to Gaeta in disguise. France restored him the following year, while Austria protected his legations until 1859, and French soldiers garrisoned the capital until 1870. Victor Emmanuel, King of Italy, had already extended his territory by annexations, and the Papal States now voted to join his dominion. Since then the Pope has not exercised temporal authority, except within the limits of the Vatican. Believing that the Papacy should not be subject to any temporal ruler, he has not set foot outside of these limits since 1870.

PAPAW (pâ-pạ′), a tree native to tropical America, allied to the passion flower family, now cultivated extensively in tropical countries. It has a remarkably tapering stem crowned by a tuft of leaves on long footstalks, with the flowers below, and grows to a height of from fifteen to twenty feet. The wood is soft and of little value in manufacture, but its fruit, consisting of a dingy orange-colored product about the size of a small melon, is eaten raw, cooked, or pickled. The rind of the fruit is thick and fleshy, and its rather tender skin is yellow when quite ripe. The fleshy part, which contains two rows of large, flat seeds, is soft and sweeter than that of the banana. Medical properties are obtained from the fruit and rind, while the juice of the leaves and fruit is used in rendering meat tender. This class comprises about twenty species, including both trees and shrubs, and all are native to tropical America.

PAPER, a material made by chemical and mechanical processes from vegetable fiber, straw, rags, wood, bark, and other substances, and used for wrapping, writing, printing, and many other purposes. The ancients did not make paper like that manufactured at present, but instead prepared a product from papyrus, a reed native to Egypt, securing from the inner bark the principal writing material that served various purposes for many centuries among the nations bordering on the Mediterranean. The name paper was derived from *papyrus,* but the ancient product was very much unlike the paper now used. It was prepared by laying strips of the inner bark of the papyrus plant so they would lap over each other, and these were united to each other by pressure, the juice of the plant supplying the necessary amount of mucilaginous matter to hold the parts together. At present over 400 different materials are employed in making paper, but the best product is obtained from esparto grass and rags. However, trimmings and paper which is already written or printed on are used extensively for remanufacturing.

It is thought that the manufacture of paper similar to the kinds now used dates from the 2d century B. C., when the Chinese produced an excellent quality from vegetable fibers, especially cotton. The manufacture of paper from vegetable fibers was introduced in the western portions of Asia several centuries later, and its manufacture in Europe was first instituted in Spain by the Moors about 1154. Soon after the enterprise of making paper developed in France, Germany, and Italy, and by the 14th century it had grown into an important industry. The use of vegetable fibers in paper making declined considerably in the 16th century, for the reason that it was discovered that cotton and linen rags are excellent materials for making a fine product. Immediately many persons found employment in gathering old material of this character for the factories. The invention of printing and the publication of large editions of a multiplicity of books and periodicals increased the consumption rapidly. Subsequently the demand was enhanced by the use of paper for hangings, wrappings, and various other purposes. This circumstance caused much energy to be devoted to the selection and employment of a large number of substances that offered to supply cheaply and abundantly the popular demand. In 1772 a German paper manufacturer named Schaffers published a catalogue containing specimens and prices of paper made from 65 different vegetable substances.

The process of manufacturing paper depends largely upon the kind of material used. Within recent years vast machinery has been perfected by which the product is not only improved, but the output has been greatly enlarged. Three general classes of paper are recognized, including wrapping paper, printing paper, and writing paper. *Wrapping* paper was originally made of jute, hemp, old rope, and other substances. These materials are still used extensively, but the manila wrapping paper of commerce is now obtained largely from wood. *Printing* paper is divided into *book* papers and *news* papers and is made largely of ground wood. *Writing* paper comprises the grades which are used in all classes of writing and for bookkeeping. Writing papers of all kinds are known in the trade as *flat* papers, since they are generally unfolded. Other classes of papers include coated papers, wall paper, and tissue paper. All good grades of paper contain the *water mark,* which is impressed upon the web at each revolution of the dandy roll, on which the design is placed.

Formerly the staple grades of writing and

(Opp. 2098)

HOUSE FURNISHINGS AND PAPER HANGINGS.

Upper Views—1. Child's Room; 2. Bathroom; 3. Bedroom.
Lower Views—1. Dining-room; 2. Living-room.
Notice the styles of furniture and the kinds of wallpaper.

printing paper were made of rags and esparto. At present the printing paper is made largely of wood pulp, with which a certain per cent. of cotton waste and rags may be added to give it strength. The best grade of writing and printing paper is still made from rags, whether by hand or machine. The process of manufacture differs somewhat according to the kind of material used, though in all grades it is necessary to prepare the substances by cleaning them of all the dust and dirt, and separating them according to the kind of product wanted. They are next reduced to a pulp, which is cleansed and bleached, and afterward is sized by depositing on the fibers a slightly mucilaginous composition, when a coloring matter is added. This mass is subjected to beating, after which it is run through a strainer into the chests of the paper machine. From this chest it flows through an orifice and is spread in the form of a thin film on a mechanical contrivance that rapidly absorbs moisture, and, when it is sufficiently dried, passes between a series of rollers that gradually tighten until it is reduced to the desired thickness. The last of the rollers are sufficiently heated by steam to take out a large part of the remaining moisture and give it a glossy appearance. It is then wound upon large rollers to be marketed, or is cut into different sizes as desired.

Machine-made paper consists of a continuous sheet. Newspapers of large circulation use webs of great length for printing, and these are not cut until after the paper has been printed. This is also the case with much of the wrapping paper, but the hand-made and the kinds used for general purposes is usually slit into smaller sheets. William Rittinghuysen established the first paper manufactory in America, in 1690, on a tract of land now included in Philadelphia. Wood pulp and wood fibers were first introduced by an American manufacturer about 1854, and as a result the price of paper was greatly reduced. However, the vast increase in the consumption of paper and the limit of the supply of timber have caused the value to be enhanced materially. At present paper and wood pulp are used for many different purposes, including collars, articles of dress, car wheels, boats, water tanks and pails, and others quite similar, the processes of manufacture differing according to the purpose for which the product is designed.

The United States produces more paper than any other country in the world. In 1922, the total output was 3,096,696 tons. Other countries producing large quantities include Canada, France, Austria, and Italy. Among the states having large paper manufactories are Massachusetts, Connecticut, Pennsylvania, New York, Ohio, Minnesota, Kentucky, and New Jersey. Canada exports vast quantities of paper, wood pulp, and pulp logs. Ontario, Quebec, and British Columbia have extensive paper producing industries.

PAPER HANGINGS, or **Wall Paper,** a class of ornamental papers manufactured to decorate the walls and ceilings of private and public buildings, which are generally attached by pasting. Paper of this class was first manufactured in China, but it is now used extensively in all the civilized nations. The designs are printed mostly by machines, corresponding to the methods by which calicos are printed. A grade of paper having a velvety surface is called *flock paper,* and is made by fastening shearings of woolen cloths to the paper by means of varnish. The finest grades of paper are hand-painted, though these are rarely used except in the most expensive buildings. Some of the colors used in making paper hangings are highly poisonous and many are made of mineral substances.

PAPHOS (pā'phos), or **Papho,** the name of two ancient cities on the island of Cyprus, both probably founded by the Phoenicians. Old Paphos, now *Kuklia,* is located about a mile from the southwestern coast and is mentioned in the poems of Homer. New Paphos, the modern *Baffo,* is seven miles inland and was the capital of the island during Roman occupation. In this place Saint Paul struck Elymas, the sorcerer, with blindness and preached to Sergius, the proconsul, an account of which is found in the Acts of the Apostles.

PAPIER-MACHÉ (pā-pyā'-mä-shā'), a material made from pulp paper, or from pulp containing an admixture of size oil, resin, paste, or other sizing substances. It is produced to some extent from sheets of paper glued and pressed together. Many widely different methods are employed in making this product, but the most common species are prepared by pulping any kind or several kinds of paper into a mass of doughy consistency. To this earthy matters are added, such as sulphate of iron, glue, and quicksilver, to resist the action of water. It may be rendered fireproof to a considerable extent by adding a sulphate of soda and borax. Papier-maché is used for many purposes in the industries. In Europe pipes and snuff boxes are made of it. This material enters to a considerable extent into the manufacture of trays and lacquered boxes, especially in Persia and Turkey, and is variously used for tableware, desk furniture, and interior architectural ornaments. Other objects made of it include cigar boxes, tubes for drinking lemonade and other cold drinks, water pails, rims for bicycles, car wheels, utensils, doors, and matrices for stereotyping newspapers and books.

PAPILLAE (pā-pĭl'lē), the minute conical processes of the body that project from the true skin into the epidermis. They are vascular and nervous in their character. The sense of touch is exercised chiefly by the papillae of the skin, and the sense of taste is dependent upon the papillae of the tongue. Each single papilla projects above the skin or membranes. It may

be divided or single, or may have a secretory function.

PAPINEAU (pä-pē-nō′), **Louis Joseph,** public man, born at Montreal, Quebec, in 1789; died Sept. 23, 1871. He studied at the seminary of Quebec and took up the practice of law. In 1809 he was elected to the legislative assembly of Lower Canada, and later joined the militia for service in the War of 1812. He was again elected to the Provincial Legislature in 1815 and in 1827 and for some time was speaker in the lower house, where he led the opposition against the British party. He was accused of high treason for taking part in the armed movement for constitutional government in Lower Canada, but escaped to the United States and thence went to France. In 1847 he returned to Canada, a general amnesty having been proclaimed, and served in the lower house of the Dominion.

PAPPENHEIM (päp′pẹn-hīm), **Gottfried Heinrich, Count von,** eminent soldier, born in Pappenheim, Germany, May 29, 1594; died in Leipsic, Nov. 7, 1632. He descended from an ancient Swabian family, and secured a liberal education at Altdorf and Tübingen. When twenty years of age, he joined the Roman Catholic church and entered the military service under the King of Poland against Turkey and Russia. In 1620 he led the forces that defeated the Bohemians at Prague, and from 1623 to 1625 commanded the Spaniards in Lombardy. He was given a command by Austria in 1626, when he suppressed an insurrection of peasants, and soon after aided Tilly against Christian IV. of Denmark. After the death of Tilly, Pappenheim joined Wallenstein in the war with Saxony, and fought with him at Lützen against Gustavus Adolphus. While Wallenstein's army was retreating before the advance of the Swedes, he made a gallant charge upon the enemy's left wing, but fell mortally wounded with two musket balls in his breast and died the following day.

PAPUA (păp′ŏŏ-ȧ). See **New Guinea.**

PAPYRUS (pȧ-pī′rŭs), a genus of rushlike plants of the sedge family, growing in marshy places from rootstalks. The stem grows to a height of from six to fifteen feet. It is naked, except near the root, and at the top is a bunch of leaves formed much like an umbrella. The flowers occur on scaly spikelets and are surrounded by long bracts, and the seeds are three-cornered. In former times the papyrus plant was cultivated to a considerable extent in Lower Egypt, but it is now of rare occurrence in that region. At present it is found extensively in Syria, tropical Africa, and southern Italy. The ancients used it in preparing writing material as early as 2000 B. C. Many written rolls made of this product are still intact, some of the papyri extant dating from the sixth Egyptian dynasty. The preservation from remote centuries is due principally to the manner in which it is prepared and to the peculiarly dry climate of Egypt.

Writings on papyri do not constitute bound books, but form extensive rolls made by pasting together different parts of the inner bark of the papyrus plant with a gummy substance under pressure, and they were often thickened by pasting several layers together. The writing was done with a pen made of reed, and with an oil and charcoal ink. Papyrus newly prepared has a whitish color and may be rolled with ease, but later it assumes a brownish tinge and is quite easily broken. Many thousands of ancient writings committed to these papyrus rolls have been deciphered, and from some of them much information of historical value has been obtained. Different species of the plant are now of value in supplying materials for the manufacture of cordage, sandals, boats, sailcloth, wearing apparel, and utensils. A fine class of mats is made from a species common to India, and several inventors have used the fibers obtained from others in paper making.

PAPYRUS SWAMPS IN EGYPT.

PARÁ (pȧ-rä′), or **Belem,** a city in Northern Brazil, capital of the state of Pará, on the estuary of the Pará River, near the Bay of Guajara. It has a fine harbor, though its location is about 75 miles from the mouth of the river. The river channel is twenty miles wide at the

city and sufficiently deep to admit vessels of the largest size. Among the improvements are paved streets, waterworks, a botanical garden, a college, and a number of public schools. The principal buildings include the palace, the cathedral, and several fine churches. It has a vast export trade in India rubber, cotton, coffee, sugar, tobacco, cocoa, live stock, hides, and lumber. The manufactures include utensils, clothing, machinery, earthenware, and toys. It has imports of flour, cutlery, hardware, and cotton and woolen goods. The climate is healthful and the tropical atmosphere is tempered by sea breezes. In 1835 it was the seat of a revolution. The larger commercial progress of Pará dates from 1848. A large majority of the people are of Portuguese descent. Population, 1908, 98,-647; in 1922, 271,048.

PARABLE (păr'ă-b'l), a short narrative intended to illustrate some principle in moral or religious teaching. Both the Talmud of the Jews and the Bible contain many parables. The story of the ewe lamb, told by Nathan to David, is a familiar parable of the Old Testament. Jesus taught his disciples and the multitude by the narration of parables, such as those of the Good Samaritan, the Talents, the Tares, the Ten Virgins, the Prodigal Son, the Mustard Seed, and the Rich Man and Lazarus.

PARACELSUS (păr-ă-sĕl'sŭs), the name assumed by Philippus Aurelous Paracelsus Theophrastus Pombastus von Hohenheim, a German physician and chemist. He was born at Einsiedeln, Switzerland, in 1493; died Sept. 23, 1541. For a number of years he traveled in the southern part of Europe, where he studied the remedies not in common use among physicians, and on returning to his native country performed many remarkable cures. In 1526 he was made professor of physics and surgery in the University of Basel, and as such claimed to understand the art of prolonging life and curing all diseases. He lectured in public to large audiences, slept in his clothes, and practiced many oddities in language and personal habits. However, he taught some true principles in regard to the use of sulphur, opium, mercury, and antimony in medicines. Erasmus was attracted by his lectures and conducted some correspondence with him.

PARACHUTE (păr'ă-shut), an umbrella-shaped apparatus used chiefly by aëronauts in descending from balloons. It is constructed after the plan of an umbrella and is carried upward with the balloon in a closed condition, but when the aëronaut starts to descend it expands at the top, thus serving to moderate the velocity of the descent. Parachutes were first used in 1617. Since then many have been manufactured and successfully employed in descending great heights attained by balloons, and for descending precipitous mountains. However, they are not to be depended upon absolutely. In order to use a parachute successfully it is necessary to ascend a sufficient distance in order that it may open sufficiently and limit the descent to a safe velocity before the aëronaut reaches the surface.

PARADISE (păr'ă-dīs), a word used by ancient writers to designate the hunting and pleasure parks of the Persian kings. Later it came to be applied by the Hebrews to the Garden of Eden, hence to signify the abstract idea of perfect felicity and heavenly blessedness. The later Jews applied the word to express the happiness of the righteous in a future state, in which sense it is used at present. Christians generally regard the celestial paradise as identical with heaven. It is in this sense that Christ spoke to the penitent thief upon the cross, "Today shalt thou be with me in paradise," Luke xxiii., 43. *Koran Gannah,* the paradise of the Mohammedans, is a place where the followers of the prophet are received after death.

PARAFFIN (păr'ăf-fĭn), a substance obtained by destructive distillation of bituminous shale, wood, coal, peat, and lignite. More recently it has been derived from petroleum and other liquid oils. It consists of a mixture of several hydrocarbons, has a waxy composition, and when pure is colorless and translucent. It has neither taste nor smell. Paraffin is manufactured extensively. The process includes heating bituminous shale in an iron retort for the purpose of condensing the tarry ingredients. These are next distilled and treated with chemicals, such as soda and acids, and afterward are distilled a second time. After the product is cooled, it is submitted to pressure for the purpose of separating the heavy oily substances that contain the paraffin and the latter is purified with naphtha, which is removed from it by pressure after cooling. Candles are made from refined paraffin, but with some grades a quantity of wax is mixed. The heavier oils obtained in distillation serve for lubricating machinery and the lighter are used in illuminating. Paraffin products are useful in water proofing, and serve as a protecting agency against atmospheric decomposition. To withstand the influence of the atmosphere, the obelisk in Central Park, New York City, was coated with paraffin in 1885.

PARAGUAY (pă-rà-gwī'), a river of South America, rises in the state of Matto Grosso, Brazil, and, after a general course of 1,750 miles toward the south, joins the Paraná at Corrientes. The valley of the Paraguay has extensive forests and much fertile land. In its upper course occurs the Marsh of Xarayes, a large region of southeastern Brazil, which in the rainy season forms an expanse of water fully 200 miles from north to south. The principal tributaries of the Paraguay include the Vermejo, Apa, Tacuari, Cuyabá, Jaura, and Pilcomayo. It is navigable to Cuyabá and forms a water course of much value to Paraguay and Brazil. Among the cities on its

banks are Asunción, Tres Bocas, San Pedro, and Concepción.

PARAGUAY, a republic of South America, surrounded by Bolivia, Brazil, and Argentina. It is located entirely inland and is bisected by the Tropic of Capricorn. The eastern boundary is formed chiefly by the Paraná, which separates the southeastern part from Brazil, and the western border is formed almost entirely by the Paraguay and Pilcomayo rivers, which form the natural boundary between it and Argentina. The length from north to south is about 375 miles, which is practically the same as its extent from east to west, though the general outline is irregular. It has an area of 97,722 square miles.

Description. The entire country lies in the basins of the Paraguay and Paraná rivers, and the general altitude is about 300 feet above sea level. A plateau extends through the eastern part, crossing the border from Brazil, but the hills and ridges are not higher than 1,600 feet. Large tracts of morasses and lagoons characterize the southern part, which has dense growths of semitropical vegetation. In the western part are low ridges that extend into the country from the Andes, but the surface is best described as a grassy plain.

The drainage is toward the south. Through the central part flows the Paraguay, which forms the southwestern border, and near Asunción it receives the Pilcomayo. The Aquidaban, a confluence of the Paraguay, drains the northeastern part. All of the southern section is tributary to the Paraná. The only lake of note is Ypoa and this is a body of shallow water.

The climate is hot during the summer, but refreshing breezes sweep across the country from the southeast. In winter, extending from May to August, the temperature ranges from 40° to 86°. The greatest summer heat occurs in January, when the thermometer registers 98° to 104°. Two seasons characterize the climate, the period of hot and the time of spring-like weather, the former extending from December to February and the latter making up the balance of the year. Rainfall is abundant, an average of 46 inches, and is confined chiefly to the growing period from August to November. The climate is healthful and favorable to Europeans.

Resources. Vast forests skirt most of the hilly portion. Along the Paraná and Paraguay are occasional tracts of almost impenetrable timber, though some of the lowlands are treeless plains. The forests yield a large variety of excellent timber, including many species that are useful for cabinet and carpenter work. The timber products include gums, dyestuffs, tan bark, vegetable oils, and India rubber. Groves of bananas, orange trees, and yatais palms are abundant. Many wild animals are common to the plains and woods, such as the tapir, marten, deer, alligator, and lion or puma. Birds of song and fine plumage are abundant and the wading birds are well represented.

Minerals are not as abundant as in some of the more elevated countries of South America, and comparatively little has been done to develop the mining resources. Valuable deposits of copper and iron are known to exist. The coal and oil fields are extensive. Marble and granite are abundant in the north, and large deposits of clays are distributed throughout the country.

Industries. Agriculture is the principal industry. The soil is noted for productiveness and fertility, but the cultivated area does not exceed 500,000 acres. Paraguay tea, or *yerba mate,* is grown in large quantities and much of the product is exported to other countries of South America. It is gathered from the wild shrub, or from the cultivated plant, and is used as a beverage as tea or coffee. Maize is the principal cereal, but considerable interests are vested in the cultivation of rice, wheat, and oats. Sugar cane, cotton, tobacco, coffee, and fruits are abundant. The orange is native to Paraguay and the product is used partly to fatten swine, but large exportations of this and other fruits are made. Cattle greatly exceed in number and value all other live stock and the herds are grown chiefly for meat. Other domestic animals include horses, swine, mules, sheep, goats, and poultry.

Manufacturing has not been developed to a considerable extent, but foreign capital is being invested in various industries under encouragement by the government. Rum is made from sugar cane juice and the country has several hundred distilleries for making spirits of different kinds. Sugar and cigars are produced in large quantities and tanning is receiving attention. Lumber products are quite numerous, especially furniture and farming utensils. Other manufactures include soap, clothing, brick, flour, matches, leather, and earthenware.

Communication is limited largely to navigation on the Paraná and Paraguay rivers, by which commerce has an outlet through the Rio de la Plata to the Atlantic. A railway extends from Brazil to Asunción and a number of branches have been built, but the total lines do not exceed 300 miles. The imports are somewhat less than the exports, and foreign trade is largely with Great Britain and Germany. Textiles and machinery make up the principal imports. The exports include fruits, leather, hides, live stock, quebracho logs, lumber, and ostrich feathers.

Government. The present constitution was ratified by a popular convention in 1870. It vests the executive authority in a president, who is elected by popular vote for four years and cannot be reëlected to succeed himself. In the exercise of his functions he is aided by the five cabinet officers of foreign affairs,

war, finance, worship and justice, and the interior, all of whom are responsible to the legislature. The legislative authority is vested in a congress of two houses, a senate and a chamber of deputies, and the members of both are chosen by popular vote in districts, the senators for six and the deputies for four years. A supreme court is the highest judicial tribunal and subordinate to it are the inferior and magistrates' courts. Local government is administered in districts known as *departments*, which are subdivided into *cantons*.

Education. School attendance is nominally compulsory, but illiteracy among the adult population is about twenty per cent. The schools are supported by state and local taxation and a part of the public funds is used to maintain private schools. Near Asunción is an agricultural school and model farm. The national university is located at Asunción, at which about 250 students are in attendance. Roman Catholicism is the state religion, but religious worship is free to all classes. A number of libraries, scientific and educational associations, and parochial and denominational schools are maintained.

Inhabitants. Encouragement is given to immigrants by the government, which has been the means of establishing several agricultural colonies. The foreign population consists chiefly of Italians, Germans, French, and Spaniards. Asunción, on the Paraguay, is the capital and largest city. Other cities include Villa Rica, Concepción, Carapegua, Paraguari, Villa del Pilar, and San Pedro. In 1922 the country had a population of 931,347, including 50,000 Indians.

History. The history of Paraguay begins with 1515, when it was explored by Juan Diaz de Solis. The first settlement was made at Asunción by a colony under De Mendoza in 1535. It was originally a possession of Spain and a government by Spanish Jesuits was established in 1608, but they were expelled in 1758 by a force from Brazil, which was supported by dissatisfied residents. Independence from Spain was secured in 1810 and the following year a consul was elected. The title of the chief executive was changed to dictator in 1814, which continued to be the official title until 1844, when Don Carlos Antonio Lopez secured an election as president for ten years. In the early administration of this official commercial intercourse was made free to all nations. He remained the president until his death, in 1862. His son, Don Francisco, succeeded him and took steps to conclude commercial treaties with the United States, Brazil, France, Germany, England, and other countries. A war with Brazil began in 1864, which terminated in 1870 by the death of the president. A more liberal constitution was adopted in the same year. Asunción was the seat of an international agricultural exposition in 1907.

PARALLAX (păr'ạl-lăks), the apparent displacement of a heavenly body due to a change in position of the observer. The angle subtended at the body by the line adjoining the two stations is the measurement of the parallax. The displacement is greatest in the horizon, where it is termed *horizontal parallax*. *Annual parallax* is the variation of a star's place by being observed from opposite points of the earth's orbit. This is so extremely small, notwithstanding the great length of the base line, that it was long difficult to determine the extent of it, or even that it existed. Tycho Brahe considered the apparent absence of stellar parallax to be fatal to the theory of Copernicus, that the earth has an orbital motion. Galileo demonstrated the problem by observing two stars of different magnitudes situated near each other, and this method has been used successfully by modern observers. Astronomers now measure, by the aid of trigonometry, the distance of the heavenly bodies from the earth, since the angle of the parallax depends upon the distance of the body from the observer.

PARALLELOGRAM OF FORCES (păr-ạl-lĕl'ō-grăm), a term applied in physics to a parallelogram, two of whose adjacent sides represent in magnitude and direction two vector quantities, as forces or accelerations. The diagonal of the parallelogram drawn from their junction represents the resultant of the two forces.

PARALYSIS (pà-răl'ĭ-sĭs), or **Palsy**, the partial or total loss of motion or sensation, due to an interruption or destruction of the nervous influence necessary to those acts. It may affect only certain parts of the body, as in certain limbs, or may extend to all the organs. Paralysis sometimes affects the nerves of the special senses, causing blindness, deafness, the loss of smell, or the loss of taste. The loss of the sense of touch or feeling, known as *anaesthesia*, is rare, but it is sometimes partial in connection with the loss of motion. Apoplexy, or paralytic stroke, which is a common form of paralysis, often results in a partial or total loss of motion on one side of the body, especially in the limbs and the muscles of the face and tongue. It may be due to pressure upon a nerve center caused by a clot of blood in the brain, or to certain mineral poisons, such as preparations of lead and arsenic. In general, paralysis may be said to be a symptom rather than a disease. Diseases of the brain and spinal marrow produce the most numerous and severe cases of paralysis.

PARAMARIBO (păr-à-măr'ĭ-bō), the capital of Dutch Guiana, on the Surinam River, about twelve miles from the Atlantic Ocean. It is regularly platted, the streets intersecting each other at right angles, has an extensive harbor, and is the principal commercial center of the possession. The chief buildings include

a governor's palace, several fine churches, a number of schools, and a college. It has many fine gardens and parks and the streets are covered with shell sand. The climate is moist and somewhat unhealthful. Among the principal manufactures are sugar, clothing, rum, molasses, chemicals, and textiles. The trade of Dutch Guiana is centered entirely at this place. Population, 1922, 35,508.

PARANA (pä-rà-nä'), a river of South America, the next in size to the Amazon, having a length of 2,500 miles and a basin of 1,240,000 square miles. The source is in the southern part of Brazil, where it is formed by the junction of the Paranahiba and Rio Grande rivers. It has a general course toward the southwest until it is joined by the Paraguay, near Corrientes, where it makes a bold curve and flows west of south to Santa Fé, where it assumes a southeasterly course, and near the southwestern corner of Uruguay it enters the estuary of the La Plata. The Paraguay is its principal tributary. Other tributaries include the Salado, Tiete, Mogy, Ivahy, Iguassú, and Paranapanema. The Paraná River exceeds in size all the rivers of America except the Amazon and the Mississippi, and is larger than any of the great rivers of Europe. Near the entrance of the Iguassú are rapids, extending about 100 miles, but it is navigable for more than 700 miles, and thus forms an important course for navigation. In its valley are vast forests of deciduous trees. The fisheries are productive, yielding many species of fin and shell fishes.

PARAPET (păr'à-pĕt). See **Fortification.**

PARASITES (păr'à-sīts), a term applied to forms of life which subsist on other living organisms. Animal parasites attach themselves to the exterior or interior portions of other animals, where they feed and take from them nutritious substances already assimilated in a large measure. Some forms of parasitic animals secure nothing more than an abode, while true parasites feed upon and live from the substance of the animals which they infest, such as hydrachnids, tapeworms, flukes, body lice, and bird lice. Parasitic plants subsist and receive nourishment from other plants, but the list includes a number that subsist on animal tissues, these being generally called *entophytes.* On the other hand, *epiphytes* are different from parasitical plants in that they subsist merely on decayed particles of the bark and other parts that do not constitute a portion of the living plant. The most important parasitical plants include the small fungi, such as smut, rust, and brand. The mistletoe and a number of other plants that have evergreen leaves are among the larger forms of this class. Other forms having scales instead of leaves include the broom rape and dodder.

PARASITIC DISEASES (păr-à-sĭt'ĭk), a subdivision in the classification of diseases, which are produced by parasitic plants or animals. The organisms which give rise to these ailments are low in the scale of life and find lodgement in some tissue or organ, or in some cases upon the surface of the body. Ringworm is caused by a vegetable parasite, while the trichina, the tapeworm, and the louse are parasitic animals that produce diseases or a diseased condition.

PARCEL POST. See pages 2291, 3280.

PARCHMENT (pärch'mĕnt), a material for writing, obtained from the hide of a sheep, she goat, young calf, or some other animal having a thin skin. The ancients prepared writing material of this class as early as 500 years B. C. In the time of Herodotus it formed an important material in book making. Parchment is prepared by removing the hairs from the skin, after which it is stretched over a frame for the purpose of removing the fleshy parts by scraping, care being taken to have it entirely free from wrinkles. It is next reduced to about one-half its former thickness by rubbing with slacked lime and a pumice stone. Transparency and toughness are secured by placing it for a short time in a solution of sulphuric acid. Drumheads are made from wolf skins and sieves from the skins of goats. Vellum is a fine parchment made from the skins of kids and calves. A substance known as *paper parchment* was invented in 1847. It is used for legal and other documents, including some maps and diplomas.

PARDO-BAZĂN (pär'dō-bà-thän'), **Emilia,** novelist, born in Coruña, Spain, Sept. 16, 1851. She studied in her native city and was married in 1868, when she took up her permanent residence in Madrid. Her first literary production was an essay on Benito Jerónimo Teijóo, a Benedictine monk, for which she was awarded a prize in 1876. Subsequently she traveled in Italy, France, Germany, and England, and on returning to Madrid devoted her time exclusively to writing and literary criticism. Her style resembles that of Zola, though it is original and realistic. Her language is forceful and in analyzing she is keen and thorough. Among her best known novels are "La dama joven," "Los pazos de Ulloa," "Pedro Antonio de Alarcón," "Pascual López," and "La madre naturaleza." She died at Madrid, May 12, 1921.

PARDON, an act of grace by which the chief executive of a municipality or state remits the penalty for a crime. Reprieves, commutations, and pardons are in most cases granted only by the governor of a province or state, or some official equivalent to that officer, such as the lieutenant governor in the provinces of Canada. A *reprieve* is the postponement of the execution of a sentence, and a *commutation* is a change from the penalty inflicted to something less severe. Pardons are either absolute or conditional and in the latter case they are usually dependent upon the future conduct of the person pardoned. In some states it is necessary to have the concurrence of one branch of the legisla-

ture, while in others the whole subject is referred to a board of pardons, of which the governor is an *ex-officio* member.

PARE (pà-râ'), **Ambroise,** noted surgeon, born near Laval, France, in 1517; died in Paris, Dec. 22, 1590. He was apprenticed to a barber and surgeon and, after developing a desire to study anatomy and surgery, went to Paris to pursue a course in those branches. His limited means made it impossible to secure instruction from teachers of eminence, but he acquired the use of a number of books and was later admitted for training in the Hôtel Dieu of Paris. He joined the army as surgeon in 1536 and soon after accompanied the forces to Italy, where he attained much success in the treatment of wounds by applying ligature instead of cauterizing with iron at red heat. This mode of stopping hemorrhage by closing the arteries had been used previously, but it had not yet come into the general practice. His success in this line caused the Royal College of Chirurgy at Paris to select him as the president, and Henry II. appointed him court surgeon in 1552. Later he attended Francis II., and subsequently became king's surgeon to Charles IX. and Henry III. His writings embrace a number of treatises on surgery and contain valuable and authoritative chapters on gun-shot wounds. "Five Books of Chirurgy" embraces his principal work, which has gone through many translations.

PARENT AND CHILD. See **Infant.**

PARHELION (pär-hēl'yŭn), a mock sun which appears in the form of a bright light, sometimes near the sun and sometimes opposite to it. It is tinged with colors like the rainbow and is due to certain modifications which light undergoes when coming in contact with small particles of moisture, such as drops of rain or crystals of ice. In some cases several mock suns appear at the same time, known as *parahelia,* which are connected by halo or a white circle. See **Halo.**

PARIA (pä'rē-à), **Gulf of,** a body of water in South America, on the coast of Venezuela, extending inland from the Atlantic Ocean. It is 40 miles wide by 100 miles long. The Paria Peninsula separates it from the Caribbean Sea, while the island of Trinidad lies between it and the Atlantic. Columbus explored the vicinity in 1498. A branch of the delta of the Orinoco flows into the gulf.

PARIS (păr'ĭs), a city of Illinois, county seat of Edgar County, 170 miles south of Chicago, on the Vandalia Line and the Cleveland, Cincinnati, Chicago and Saint Louis railroads. In its vicinity is a fertile agricultural and dairying country, which contains deposits of bituminous coal. The noteworthy buildings include the county courthouse, the high school, and many fine residences. Among the manufactures are ironware, machinery, shoes, flour, and utensils. Paris has good municipal facilities, including waterworks and sanitary sewerage. The place was platted in 1825 and incorporated in 1849. Population, 1900, 6,105; in 1920, 7,985.

PARIS, a city in Texas, county seat of Lamar County, 112 miles northeast of Dallas, on the Texas Midland, the Texas and Pacific, the Atchison, Topeka and Santa Fé and other railroads. It is surrounded by a fertile farming, fruit-growing, and stock-raising country. The principal buildings include the post office, the county courthouse, the high school, the public hospital, and many churches. Among the manufactures are machinery, canned goods, flour, artificial ice, furniture, clothing, cotton products, and farming implements. The general facilities include pavements, electric lighting, waterworks, and sanitary sewerage. It was settled in 1841 and was chartered as a city in 1889. Population, 1900, 9,358; in 1920, 14,939.

PARIS, the capital and metropolis of France, in the department of Seine. It occupies a fine site on the Seine River, 108 miles from its entrance into the English Channel. The larger part of the city is on a level plain, about 200 feet above the sea, and is surrounded by low hills that rise fully 200 feet above the common level. The river has a course of eight miles in the city and is connected in various directions with canals, thus affording a fine system of navigation. Many important railway lines enter the city, providing transportation facilities to all parts of Europe and giving Paris the advantage of being the most noted railroad center of France. Lines of electric railways afford access to all urban and many suburban points, and connected with these are interurban lines that communicate with the leading cities of northern France. Near the borders of Paris are the beautiful suburbs of Boulogne, Neuilly, Vincennes, Gentilly, Pantin, Aubervilliers, Charenton, and a number of others. On the western border is Fontainebleau, noted for its fine palace and art collections. A large part of the traffic within the more thickly settled business section of the city is carried by an underground railway, one of the most extensive and finest equipped in the world.

FORTIFICATIONS, BRIDGES, ETC. A line of fortification 22 miles in length surrounds the city, and outside of it are forts arranged in two main lines. The outer wall is strongly fortified, but may be entered by a number of gates. The Seine is from 425 to 525 feet wide. It incloses within the city three islands, known as La Cité, Cygnes, and Saint-Louis, and embankments and quays protect the city from inundations. These embankments provide excellent boulevards, but the improvement known as the *Boulevard* forms an irregular arc on the north side of the Seine, extending from Place de la Madeleine to Place de la Bastille. Many beautiful bridges cross the river, including a number that have been used in traffic from 300 to 400 years. A number of these bridges have historical significance, having been built at intervals by the kings and

other chief executives of France. Groups of trees and parkways adorn many of the bridges and quays, thus affording both convenience and pleasure to the populace.

Construction, Utilities, and Parks. Most of the houses in Paris are built of white calcareous stone and the usual height is from five to seven stories, each floor being arranged in compartments for separate tenement dwellings. The older part of the city is grouped largely in the vicinity of the Ile de la Cité, which contains the Cathedral of Notre Dame. Here the streets are irregular and narrow, but in the newer part they are wide, regular, and well paved. Public lighting with gas and electricity is general in all parts of the city. The pavements are well constructed of stone, macadam, and asphalt. Many electric railways and tramway lines connect the central part of the city with the suburbs. An adequate supply of water is secured from the Seine and Marne rivers, from artesian wells, and the Ourcq Canal. Paris has a larger number of beautiful parks than any other city in the world. The principal ones include Place Vendome, in which is located a column and statue of Napoleon I.; Place des Vosges, containing the statue of Louis XIII.; Place du Carrousel; Place de la Republique, with the republic statue; Place de la Bastille, containing the column in commemoration of July, 1830; Place de Rivoli, containing the equestrian statue of Joan of Arc; Place de Chatelet, containing the column commemorative of the Italian campaign of 1796; Place Moncey, with a monument to commemorate the defense of Paris in 1814; Place de l'Etoile, with the arch of triumph; and Place de la Concorde, a large and beautiful public square.

Monuments and Gardens. Paris as a whole is rich in statues and monuments, which collectively represent the most important events of French history, including both the grandeur of its victories in battle and the achievements in the arts of peace. It has numerous public gardens laid out with more than the usual taste and they are cared for with remarkable skill. The Gardens of Tuileries are within the city, where may be seen statues and fountains of great beauty, and the Luxembourg Gardens are in front of the palace and contain a great variety of rare plants and a number of conservatories. Other fine public gardens include the Jardin des Plantes, the Buttes-Chaumont Gardens, and many others. Père la Chaise is a celebrated cemetery, covering 107 acres, and contains many splendid monuments and tombs. The ancient quarries known as the Catacombs lie under a region in the southern part of the city. Many buildings of historical value were destroyed by the Commune in 1871, but they were replaced with much care soon after the war.

Schools and Libraries. The educational institutions of Paris take high rank among those of modern Europe. Kindergarten, elementary, and grammar schools are maintained in all parts of the city. Besides these, the city has a fine system of colleges and other institutions of higher learning. The Academy of the Sorbonne ranks among the most noted of the higher institutions. Other institutions include the University of Paris, a famous center of learning established in the 13th century, the Collége of France, the École Polytechnique, the École des Beaux Arts, and the schools of Saint Louis, Charlemagne, Descartes, Corneille, De Vanves, Fontanes, and many others. It has a vast number of splendid hospitals, excellent zoölogical and botanical gardens, museums of natural history, lecture rooms, and various professional, scientific, and religious institutions. The most noteworthy library is the Bibliotheque Nationale, which contains 2,295,000 volumes of printed books, 3,000,000 pamphlets, 200,000 manuscripts, and 6,500 portfolios of engravings. Other noted libraries are connected with the universities, colleges, public schools, and other institutions. Many learned societies have their seat in Paris, including the celebrated Institute of France. The theaters are classed among the finest in the world, including such renowned institutions as the Opera Comique, the Theatre Dramatiques, the Theatre Francais, the Folies Dramatique, and the Odeon. It has valuable collections of works of science, fine arts, and history, and a splendid museum of artillery.

Public Buildings. Paris has a large number of magnificent public buildings and palaces. The Louvre is occupied by a museum and is on a site that was formerly the seat of a castle built in the 13th century. The palaces include the Tuileries, a splendid structure partly destroyed by the Commune, but subsequently restored, the Palais Royale, the Palais du Luxembourg, the Palais de Justice, the Palais de la Elysee, and the residence of the president. Other noted buildings include the Cathedral of Notre Dame, founded in the 12th century, the Hôtel des Invalides, a retreat for disabled soldiers, which contains the burial place of Napoleon I., the Hôtel de Ville, the Tribunal de Commerce, and the Eiffel Tower. The last mentioned is the highest building in the world. It is constructed of iron lattice work, 984 feet high. Paris has many beautiful churches of historical interest, including the Pantheon, the Madeleine, the l'Oratoire, and the Saint Vincent de Paul. Others of special interest include Saint Germain des Pres, an ancient structure dating from 1163; the Sainte Chapelle, built by Saint Louis in 1245, in which he placed several relics brought from the Holy Land; and the Sacred Heart, on the heights of Montmartre.

Industries. The manufactures include a large variety of commodities, such as cotton and woolen goods, carriages, lace, embroidery, scientific instruments, artificial flowers, silk textiles, leather products, sugar, chemicals, tobacco,

clothing, machinery, engines, and utensils. Paris is noted for its production of a vast variety of ornamental commodities, including jewelry, combs, fine handkerchiefs, perfumery, and many others. The tobacco factories are chiefly in the hands of the general government, as well as large interests in printing, dyeing, knitting, and weaving, Many books and periodicals are published regularly. Paris is the financial center of France and one of the most important of Europe. It has long held a high rank as a center of fashion. As a wholesaling and jobbing center it holds the first place among the cities of France. It has a large trade in merchandise, fruits, clothing, cereals, and spirituous liquors.

Government. Paris is divided into twenty districts, or *arrondissements,* for the purpose of administering its government. The chief executive, known as the prefect of the Seine, is appointed by the federal authorities of France. Each district has four members of the municipal council, which is composed of eighty members, and these are chosen by a direct vote of the people. A mayor and two assistant councilors are the chief executive officers of each district. The assessment of property, collection of taxes, granting of licenses and privileges, administration of the schools and libraries, and other duties pertaining to the government of the city are administered in the districts, subject to review and revision by the municipal council. All parts of the city are kept unusually clean from filth. It has an efficient fire brigade and a system of policing. The public utilities are largely owned and operated by the city, including the waterworks, markets, slaughterhouses, cattle yards, drainage system, and a number of the cemeteries. Much care is exercised to protect public health and to keep the city well lighted and as free from smoke as possible. Few large cities have as fine a cab service and none is better supervised with a view of protecting life against the dangers of congested streets. Conveyance by automobiles is nowhere more extensive, but the speed limit is carefully enforced, except in the wider and longer boulevards.

Population. Although Paris is visited by many tourists at all seasons of the year, only about ten per cent. of the people are of foreign birth. A large majority are Roman Catholic, or nominally supporters of that faith, the Protestants numbering only 525,000 and the Jews 25,000. Rapid growth in the number of inhabitants dates from the early part of the 19th century, when the manufacturing and industrial enterprises attracted a large influx of people. Though the city is much smaller than London, its density to the square mile is nearly twice as large. In 1817 it had 714,000 inhabitants, and in 1851 it had 1,053,000. Population, 1906, 2,763,393; in 1921, 2,988,110.

History. The first historical information obtainable in relation to Paris indicates that its ancient site was confined to an island in the Seine, on which a tribe of Gauls, known as the *Parisii,* had their principal seat. These people occupied themselves in rude agriculture and fishing in the Seine. The city was afterward named from this tribe. The Romans under Caesar conquered the Parisii and their island town became known as *Lutetia.* In 53 B. C. it became an important Roman seat of influence and later was strongly fortified by the Romans. Julian was stationed here in 360 A. D., when he was summoned as emperor by the soldiers, and shortly after the place was named Paris. The Franks conquered it about 508, when it was made the seat of government by Clovis. It ceased to be the capital in the time of Charlemagne, but Hugh Capet established a dynasty, in 987, and converted the capital of the duchy of France into the capital of the kingdom, and since then it has remained the seat of government. From that time the population increased without intermission.

In the time of Philip Augustus, in 1200, Paris became the seat of a university, which for many years flourished as the most famous in Christendom, and the city ranked second only to Constantinople. Robert de Sorbon, a priest, founded the celebrated Sorbonne in 1253, which aided in attracting many students to Paris. A pestilence and famine spread desolation in the reign of Charles VII., in 1437-38, but with the ascension of Louis XI. prosperity returned and vast improvements were instituted. Henry IV. and Louis XIV. graded many of the streets, constructing much of the boulevard improvements still remaining. They established educational institutions and systems of drainage, sewerage, waterworks, and pavements. The Bastille fell in 1789. Shortly after the ascension of Napoleon vast sums of money were spent in building arches, bridges, public squares, and gardens.

Napoleon III. did more than any other sovereign to improve Paris and modernize it by straightening and widening its streets and establishing a system of lighting. He caused the institution of public squares, fountains, zoölogical and botanical gardens, and many splendid monuments. These improvements were followed by the International Exhibition of 1867, when Paris ranked among the finest cities in the world. A vast army of Germans laid siege to the city at the time of the Franco-German War, in 1870-71, but exercised care in preserving the institutions of value and beauty. The destruction resulting from this war is to be attributed to the Commune, under whose influence many fine monuments and buildings were destroyed, but these have been restored with marked care, and many other excellent improvements have been effected. The most noteworthy include the opening of new thoroughfares, the establishment of the Champs de Mars, in which the

Eiffel Tower is situated, and the building of electric railway lines. Paris has been the seat of the finest international exhibitions, the most noteworthy being held in 1855, 1867, 1878, 1889, and 1900. The exhibition of 1900, intended for a universal exhibit of works of art, science, mining, and agriculture, was attended by 50,120,540 people. The Germans bombarded the city incessantly by artillery and from the air in the period of the war from 1914 to 1918.

PARIS, county seat of Bourbon County, Ky., 90 miles east of Louisville, on the Licking River and on the Louisville and Nashville Railroad. It has a large trade in tobacco, spirits, and live stock. The features include the courthouse, high school, and federal building. It was incorporated in 1790. Pop., 1920, 6,310.

PARIS, or Alexander, in Greek mythology the second son of Priam, King of Troy, and Hecuba. It is related that Hecuba dreamed she would give birth to a flaming brand, and the dream was interpreted to signify that her son would destroy the city of Troy. In order to prevent such a catastrophe, she caused the babe to be exposed on Mount Ida to perish, where he was found by shepherds, who reared him as their own child. Later he was brought to his parents, who recognized him as their son.

Paris was now appointed on the delicate mission of proceeding to Salamis to recapture the beautiful Hesione, whom Hercules had carried away. Sailing with his fleet to Greece, he met Helen, the loveliest woman of her time, who was soon after given in marriage to Menelaus. Later Menelaus went on a hunting tour and in his absence Paris carried Helen away to Troy, on account of which the celebrated Trojan War resulted. It was his arrow that killed Achilles, but he died from a wound received by a poisoned arrow shot from the bow of Phyloctes. Oenone at first refused to heal him, but repented and offered to apply remedies when it was too late to save his life. The remorse at his death caused her to kill herself.

PARIS, Treaties of, a number of important treaties made at Paris, France. The Peace of Paris concluded on Feb. 10, 1763, ceded all the possessions east of the Louisiana Territory, Canada, and Nova Scotia from France to Great Britain. The treaty of Feb. 6, 1778, was made between the United States and France. By its terms the latter country recognized the independence of the thirteen colonies. The so-called First Peace of Paris, having reference to Napoleon I., was concluded on April 11, 1814, and by its terms Napoleon was banished to Elba. The so-called Second Treaty of Paris followed the return of Napoleon from Elba and his 100 days of empire. It was concluded in 1815. This treaty reduced the territorial limits of France and provided for its occupation by a foreign army. The Declaration of Paris, ratified on March 30, 1856, concluded the Crimean War and made provision in regard to the goods of noncombatants confiscated during the time of war. The treaty that concluded terms of peace between Spain and the United States was signed in Paris on Dec. 10, 1898. In 1918 the Paris Peace Congress convened here, at the close of the Great European war, but soon transferred the sessions to Versailles, where the signatories were completed.

PARIS, University of, an educational institution of higher learning in Paris, France, one of the most celebrated universities in the world. It is the outgrowth of several schools that rose to prominence in the 12th century, when thousands of students and scholars came to Paris from many countries of Europe. Extended difficulties arose between the students and citizens of Paris in 1229, when many of those in attendance left France to attend universities in England and Germany, but Pope Gregory IX. came to the relief of the institution in 1231, when the attendance greatly increased. By the 15th century it rose to much prominence in university work and both princes and popes vied to gain friends among its masters. When France became involved in civil and foreign wars, the institution began to decline, and it was further injured by the establishment of many professional and literary schools throughout Europe. Napoleon reorganized it shortly after the revolution, when it was known as the Facultés de Paris, but its present name was assumed in 1896.

At present the university comprises seven faculties. These are the council of the university, the Protestant theological faculty, the law faculty, the medical faculty (which embraces the Dupuytren Museum), the faculties of science and letters at the Sorbonne, and the school of pharmacy. The library contains 875,500 volumes. In 1922 it had an attendance of 17,250.

PARK, a tract of land set apart for public use and enjoyment, or reserved by a state or nation to conserve natural resources for the enjoyment and profit of the people. The best known national parks of the United States are the Yellowstone and Yosemite parks. Canada has some of the largest parks in the world, such as Algonquin Park in Ontario and Laurentides National Park in Quebec. The former has an area of 1,466 square miles and the latter contains 2,640 square miles. Both of these parks are intended to preserve game and encourage the study of forestry.

PARK, Edward Amasa, theologian and educator, born in Providence, R. I., Dec. 29, 1808; died in Andover, Mass., June 5, 1900. He was editor of the *Bibliotheca Sacra* for forty years. He published memoirs of Samuel Hopkins and a volume entitled *Discourses*

PARK, Mungo, noted traveler, born in Selkirk, Scotland, Sept. 10, 1771; died Nov. 19, 1806. He received a good education, studied

medicine in Edinburgh, and became assistant surgeon on the *Worcester*, a vessel that sailed to the East Indies in 1792. In 1793 he returned to England, where he was employed by the African Association of London to secure intelligence at their expense. Accordingly he sailed for Africa in 1795, reaching Gambia in the latter part of that year, where he studied the Mandingo language, but on reaching Pisania was taken captive by a Moorish chief. He escaped from captivity in 1796 and after three days reached the valley of the Niger. After proceeding down its course to Silla, he again traveled in the kingdom of Mandingo, and in 1798 returned to England. Two years later he published at London an account of his travels, entitled "Travels in the Interior of Africa." Later he settled as a surgeon at Peebles, but shortly after secured government aid to make a second journey to Africa. His company consisted of 35 Europeans, with whom he left Pisania in the early part of 1805, but all except four died in the rainy season.

PARK CITY, a city of Knox County, Tenn., near Knoxville, on the Southern and other railroads. It has a fine high school, city hall, and many substantial residences. It was annexed to Knoxville in 1917. Population, 1920, 5,626.

PARK CITY, a city of Utah, in Summit County, thirty miles southeast of Salt Lake City. It is on the Union Pacific and the Denver and Rio Grande railways and is surrounded by a rich silver-mining district. The industries include quartz mills, machine shops, and smelters. It has several fine schools and churches. Population, 1900, 3,759; in 1920, 3,393.

PARKE, John Grubb, soldier, born near Coatesville, Pa., Sept. 22, 1827; died Dec. 15, 1900. He graduated from the West Point Military Academy in 1849, and served as a topographical engineer until the beginning of the Civil War, within which time he made surveys on the northwestern boundary of the United States. In 1861 he was made brigadier general and was given a command at Fort Macon. Subsequently he commanded under General Burnside in the battles of South Mountain and Antietam, and was chief of staff to that general at Fredericksburg and Vicksburg. In 1863 he commanded the left wing of the army under General Sherman at Jackson, and took part in the defense of Knoxville and in the campaign against Richmond in 1864. Before the end of that year he became major of an engineer's corps and in 1884 was made colonel. In 1887 he was appointed superintendent of the West Point Military Academy, where he served with much success.

PARKER (pär'kẽr), **Alton Brooks,** public man, born in Cortland, N. Y., May 14, 1852. He studied for the profession of teaching at the Cortland Normal School, but subsequently decided to engage in the practice of law. In 1872 he graduated at the Albany Law School and five years later was elected surrogate of Ulster County, which position he held until 1885. He was chairman of the Democratic State committee for New York in 1885, and the following year was appointed by Governor Hill to fill a vacancy in the supreme court, to which position he was elected subsequently to the full term. In 1889 he was transferred to the appellate division of the supreme court, and was chosen chief judge of the court of appeals in 1898. He refused the Democratic nomination for Governor in 1902, but accepted the presidential nomination in 1904. During the campaign he made a number of able addresses and wrote a strong letter of acceptance, but was defeated in the election by Theodore Roosevelt. Subsequently he resumed the practice of law in New York. He died May 10, 1926.

ALTON BROOKS PARKER.

PARKER, Francis Wayland, educator, born in Bedford, N. H., in 1837; died Nov. 28, 1902. After attending public schools and fitting himself for teaching, he served as principal in the schools of Manchester, N. H., from 1865 until 1868. In the latter year he accepted a principalship in Dayton, Ohio, where he worked efficiently until 1872, when he went to Germany and took a course at the University of Berlin. He was made school superintendent in Quincy, Mass., in 1875, supervisor in Boston in 1880, and principal of the Cook County Normal School, Chicago, in 1883. He served in the latter position until 1896, when he was made principal of the Chicago Normal, and in 1899 became president of the Chicago Institute. Besides lecturing and contributing to periodical literature, he published "Course in Arithmetic," "Talks on Teaching," "How to Study Geography," "Quincy Methods," and "Practical Teacher."

GILBERT PARKER.

PARKER, Gilbert, novelist, born at Camden, East Ontario, Nov. 23, 1862. He was educated at Trinity College, Toronto, and went to Australia, where he joined the editorial staff of the Sydney *Morning Herald.* In 1886 he traveled in Europe,

Africa, and Northern Canada, and finally settled permanently in England. In 1900 he was elected to Parliament from Gravesend and was knighted two years later. His writings consist largely of works in fiction and travels. They include "An Adventure of the North," "Round the Compass in Australia," "The Battle of the Strong," "History of Old Quebec," "The Lane That Has no Turning," "The Trail of the Sword," "Donovan Pasha and Some People of Egypt," and "The Seats of the Mighty."

PARKER, Horatio William, teacher and composer, born in Auburndale, Mass., Sept. 15, 1863. He studied music at the conservatory of Munich, Germany, and on returning to America became organist at the Garden City Cathedral, Long Island. At the same time he was a teacher of music and in 1894 was made professor of music at Yale University. In 1899 he took part in a festival at Worcester, England, and subsequently in other cities of Europe. His compositions include "The Holy Child," "A Northern Ballad," "A Wanderer's Psalm," and "Hora Novissima." He died Dec. 18, 1919.

PARKER, Theodore, noted clergyman, born in Lexington, Mass., Aug. 24, 1810; died in Florence, Italy, May 10, 1860. He was the son of a farmer, John Parker, graduated from the Harvard Divinity School in 1836, and soon after became minister of a Unitarian church at West Roxbury, where he remained until 1843. In the latter year he visited the principal countries of Europe and the following year located in Boston, where he attracted large congregations at Melodeon and Music halls. Parker became distinguished as a lecturer against slavery, and his voice and pen were alike effective in fearlessly treating social and political reforms. In 1859 he visited Santa Cruz, Mexico, for the purpose of coming in touch with the climate favorable to those suffering with lung trouble, but soon after sailed to Italy, where he died. His principal publications include "Sermons for the Times," "The Transient and Permanent in Christianity," "Experience as a Minister," and "Discourse on Matters Pertaining to Religion." He was editor of the *Spiritual Interpreter* for several years and contributed to a large number of periodicals. The Boston Free Library received as a bequest his fine library of 13,000 volumes. He was buried in a cemetery outside the walls of Florence, Italy.

PARKERSBURG, a city in West Virginia, county seat of Wood County, on the Ohio River, 98 miles southwest of Wheeling. It is on the Baltimore and Ohio, the Ohio River Line, and other railroads. The surrounding country contains extensive deposits of petroleum and produces cereals, grasses, tobacco, and fruits. It has two large bridges, one across the Ohio and one across the Kanawha, which joins the Ohio within the city. The principal buildings include the county courthouse, the Washington High School, the Federal building, the public library, and the Academy of the Visitation. Other features are the public park and the Blennerhasset Island, where Harman Blennerhasset lived. Among the manufactures are machinery, furniture, rayon, tools, chemicals, ironware, refined oil, boilers, and hardware. The city has a system of public lighting, substantial pavements, waterworks, and other municipal facilities. It was settled in 1773 and incorporated in 1820. Population, 1900, 11,703; in 1920, 20,039.

PARKHURST (pärk'hûrst), **Charles H.,** social reformer and clergyman, born in Framingham, Mass., April 17, 1842. He graduated at Amherst College in 1866 and studied theology in the German universities at Halle and Leipsic. He supported Charles A. Briggs in approving much of the so-called higher criticism. His writings include "The Blindman's Creed."

PARKS, the tracts of land set apart by the government to preserve natural scenery and to furnish places where tourists and others may spend time pleasantly in search of health and recreation. Canada and the United States, the two great nations of North America, recognize the value that parks are to the people, hence many great national and local parks have been established. In 1923 more than two million people visited the national parks of these two countries, and the attendance at state, provincial and city parks was immeasurably greater.

Yellowstone National Park and Yosemite National Park are the oldest and best known, and both are described in the proper places of this work. Other great parks include Hot Springs, Park, Arkansas; Casa Grande Ruin, Arizona; Glacier National Park, Montana; Crater Lake National Park, Oregon; Mount Ranier National Park, Washington; Mesa Verde National Park, Colorado; Lassen National Park, California; Mount McKinley National Park, Alaska; Rocky Mountain National Park, Colorado; Sequoia National Park, California; and Hawaii National Park, Hawaiian Islands.

Jasper Park in Alberta, is the largest park of Canada and contains 4,400 square miles. Battlefields National Park, near Quebec, is renown for its beauty as well as for its historical interests. Other parks of Canada include Fort Howe Park, New Brunswick; Yoho Park and Glacier Park, British Columbia; Elk Island Park and Buffalo Park, Alberta; Maple Creek Antelope Reserve, Saskatchewan; and Saint Lawrence Islands Park, in the Thousand Islands of the Saint Lawrence River, in Quebec.

PARKMAN, Francis, historian, born in Boston, Mass., Sept. 16, 1823; died near there Nov. 11, 1893. He wrote a history of the French and Indian War, a work of much excellence and research. He retired to Jamaica Plains, near Boston, where he died. His writings include "The Oregon Trail," "The Conspiracy of Pontiac," "Jesuits in North America," "Pioneers of France in the New World," "Old Régime in Canada," "La Salle and the Discov-

tery of the Great West," "Count Frontenac and New France Under Louis XIV.," "A Half Century of Conflict," and "Montcalm and Wolfe."

PARLEMENT (pär'lę-mẹnt), the name applied to a number of local bodies in France before the Revolution, of which the Parlement of Paris was the most celebrated. These bodies originated from similar tribunals of the Frankish kings and their functions were judicial rather than legislative, although they exercised a modified form of both legislative and administrative power. In general the parlements opposed the kings of France, hence Louis XV. abolished the Parlement of Paris. Later, in 1790, these bodies were abolished and superseded by the National Assembly.

PARLIAMENT (pär'lĭ-mẹnt), the supreme legislature of the United Kingdom of Great Britain and Ireland, consisting of the *House of Lords* and the *House of Commons.* The name was first applied in France to signify a general assembly of the state about the middle of the 12th century, under Louis VII., but the body itself originated from the ancient Teutonic system of popular representation in government. After the Norman conquest, in 1066, the national assembly was transformed into a selected royal council dominated by the king, but the lost powers were regained from time to time, and in 1215 it became recognized in the Magna Charta as the supreme legislative body of the kingdom. However, the present legislative body of Great Britain properly dates from 1265, when two knights from each shire and 21 burgesses, or citizens, from the boroughs, or cities, were summoned by the king to meet at Westminster. The next year, in the reign of Henry III., the name *Parliament* was applied to it, and in the middle of the 14th century, in the reign of Edward III., the separation of the two houses into lords and commons occurred. It may be said that no Parliament existed between 1461 and the middle of the reign of Henry VIII., that being the period when the long struggle between the Stuarts and the Parliament occurred, which terminated in a long civil war and the execution of Charles I. Under William III. full powers were again restored to Parliament and since 1716 its legal period of duration has been seven years. In 1801 the Irish Parliament was dissolved by the Act of Union, when it was provided that Ireland should have 28 members in the House of Lords, to serve for life, and 100 members in the House of Commons, to be elected.

Parliament is convened by the sovereign, who appoints the time and opens the proceedings by the delivery of an address, either personally or by deputy. The Parliament at present is composed properly of three bodies, the *lords spiritual,* the *lords temporal* and the *commons.* The lords spiritual constitute the clergy and originally sat in both houses, but in modern times their representation is wholly in the House of Lords. Besides the clergy, the House of Lords is made up of peers created by the crown and hereditary peerage. The number of peers in 1925 was 740. This body is presided over by the chancellor, who is the keeper of the great seal. The right to originate bills to provide revenues is denied the Lords; in this respect it is similar to the American Senate. The House of Commons has 670 members, of whom 490 represent counties and boroughs and five universities in England and Wales; 70, counties and boroughs and two universities of Scotland; and 101, counties and boroughs and two universities of Ireland.

The House of Commons selects its own speaker from its membership. Members of neither house receive a salary. Each house can adjourn for a short time, but neither can be terminated except by the sovereign, and each may form its own rules. A quorum in the lower house is made up of forty members, while the upper house has no prescribed quorum. The sovereign has the right to approve or veto a bill, but the right of veto is rarely exercised. The legislative authority extends to all the colonies and possessions. A dissolution is caused by a ministerial crisis, when a new body is elected by appealing to the people. The powers of Parliament are numerous, being influential to a large extent over the sovereign. It can destroy any ministry and alter the succession to the throne, a course taken by it in several instances, and it has also changed the national religion.

The American colonies seriously questioned the right of Parliament to legislate for them. James Otis in 1761 asserted that Parliament did not have the right to tax the colonies for the reason that they were not given representation in that body. A general protest was made against the stamp act in 1765, and shortly after the Revolutionary party took the position that Parliament had no right whatever to legislate for the colonies. The Parliament of 1768-74 was noted for its opposition to popular rights both in England and America and by its policy greatly hastened the Revolution. The Massachusetts Charter Act, Boston Port Act, Quartering Act, and Quebec Act were among the most objectionable. They operated to mold the spirit that finally caused American independence. For the Parliament of Canada see **Canada,** subhead GOVERNMENT.

PARLIAMENTARY LAW, the rules of procedure recognized as the basis of government in deliberative assemblies. These rules, as the name implies, were derived from the practice of the English Parliament, but they have been gradually modified in practice to adapt them to the needs of various bodies and organizations. The purpose is to govern these assemblies in the transaction of business, and to permit the free and orderly discussion of questions before them for consideration. Unless otherwise pro-

vided, a *majority* of any assembly constitutes a *quorum* for the transaction of business, but a smaller number may meet and adjourn from time to time until the attendance of a sufficient number can be obtained. The presiding officer is charged with the duty of preserving order and enforcing the rules and order of business. In most cases he must be a member of the body over which he presides and as such is entitled to a vote, but officers who are not members, such as mayors who preside over town or city councils, usually have no vote unless there is a tie, when he may cast the leciding vote.

All business brought before a deliberative assembly must be introduced by a *motion,* or *resolution,* and no motion is considered complete unless it is supported by a *second.* Even a resolution requires the support of a motion and a second, this being necessary to show that it is supported by more than one member. The chairman, after hearing the motion and the second, states it in full, after which the subject under consideration is open for *discussion,* but the maker of the motion usually has the right to speak first. No other question can be considered while the motion is before the assembly, and the discussion must be relevant to the subject under consideration. Usually the time each member may speak is limited and no one can speak more than once, unless upon consent of a majority. After concluding the discussion, the presiding officer calls for the *vote,* which may be by voice, those favoring the motion voting *aye* and those opposing it, *no.* In some cases a record is made by calling the *roll,* while in others the decision is by a rising vote or by ballot.

A number of *subsidiary motions* are permitted while a motion regularly made and seconded is being considered, and these take precedence of all others, being designed to postpone the discussion or suppress further consideration of the question. These include a motion *to lay the motion on the table,* which cannot be debated and is intended to postpone action until some future time, when it may be taken up by the assembly. When the *previous question* is requested, all debate is stopped and a vote is immediately taken, but its adoption requires a vote equal to two-thirds of the body. A motion to refer to a committee, or to postpone action until a certain time, is in order in the regular course of business. While a motion may be amended, it is not permitted to amend the amendment, but a motion to substitute some other motion is permissible. Another means of preventing or delaying action is to move that the motion be *postponed indefinitely.* An objection to the proceedings, a motion to suspend the rules, and an appeal from the decision of the presiding officer are questions that must be disposed of immediately. Privileged questions, such as motions to adjourn, to fix a time for adjournment, to determine the rights of the assembly or its members, and to require that the proceedings be conducted according to the regular order of business, take precedence over any other question. Where an assembly regrets any action that it has taken, the vote may be *reconsidered,* when the *original question* is before the assembly and must be disposed of before any other motion can be made. If it is too late to reconsider the vote, a majority can *rescind* it, which is equivalent to reconsideration.

PARMA (pär'mȧ), a city of northern Italy, capital of the province of Parma, on the Parma River, 71 miles southeast of Milan. It is beautifully situated in a fertile region of the Lombard plain, about 12 miles south of the Po, has railroad connections with other trade centers, and is noted for its excellent public buildings. Among them is a fine cathedral, the Church of San Giovanni, the Church of La Steccata, the ducal palaces, and the Baptistry. It has a fine public school system, a noted university, several colleges and museums, and a public library of 300,000 volumes. Among the manufactures are cotton and woolen goods, silk textiles, clothing, paper, earthenware, soap, and wearing apparel. Parma was founded by the Etruscans and in 183 B. C. became a Roman possession. It was the residence of Petrarch from 1341 to 1342. Population, 1922, 51,403.

PARNAHIBA (pär-nȧ-ē'bȧ), a river in northeastern Brazil. It rises near the boundary of the province of Goyaz and, after a course of 800 miles toward the northeast, flows by a delta into the Atlantic Ocean. It has a number of large tributaries and at several places in its course are cataracts. The basin is a highly fertile region and much of its course is navigable.

PARNASSUS (pär-năs'sŭs), a snowcapped mountain range of Greece, in Phocis, 64 miles northwest of Athens. The highest peak is Mount Lycorea (now Liakoura); height, 8,075 feet. It rises over the town of Delphi in two prominent peaks and is celebrated in history as the seat of Apollo and the Muses. The oracle of Delphi and the fountain of Castalia were situated on its southern slope, and the worship of Bacchus was celebrated on its highest peak. In Mount Lycorea was the Corycian cave, sacred to Pan and the Muses.

PARNELL (pär'nĕl), **Charles Stewart,** statesman, born in Avondale, Ireland, June 28, 1846; died Oct. 6, 1891. His family was associated with Irish parliamentary life for about a century and his father, Charles Henry Parnell, owned an estate in Wicklow County, Ireland. The early education of the son was provided for in several private schools and he afterward took a course at Cambridge. Shortly after graduating he made a tour in the United States, and on returning home in 1874 became sheriff of Wicklow County. The following year he was elected to Parliament for Meath County, and soon became famous as an advocate of Home

Rule. He introduced a bill to amend the church law of Ireland in 1877, which was defeated by a decisive vote, but Parnell at once rose to influence and eminence in the Irish party. He became president of the Irish National Land League in 1879, and the following year lectured in the United States, where he secured $350,000 to aid in furthering the principles of that organization.

Parnell was chosen to Parliament from several districts in 1880, but decided to represent Cork, and in the same year instituted boycotting by depriving a party at Ennis of his former patronage. He opposed the land act and crimes act in 1881, and for violation of the latter was placed in Kilmainham jail, from which he was released in 1882 through the influence of Captain O'Shea. When the land league was disorganized by government interference, he collected large sums of money and in 1883 organized the National League, of which he was made president. At that time Gladstone became friendly to Home Rule and Parnell gave him his political support.

The London *Times* published a series of articles in 1887 which charged Parnell and his associates with being implicated in outrages committed by members of the Irish National party. These charges, although not well founded, were investigated by a commission of three, and in 1890 Parnell was exonerated from the principal ones by Parliament. In the latter year the divorce proceedings of Mrs. O'Shea implicated Parnell in a very questionable manner, by which he lost the support of many former friends. Though a Protestant, he was supported in his public career by the Irish priesthood, but after these charges had been published they refused longer to extend him their influence. Some time after he married Mrs. O'Shea, but his former party became divided into Parnellites and anti-Parnellites, and in the midst of party dissensions his death occurred.

PARODY (păr'ŏ-dy), a composition in prose or verse, intended to turn a serious composition into humor or ridicule. While it preserves the form and style, it either substitutes for the original an entirely different composition, or alters the construction so as to convey a ludicrous sense. This style of writing is very ancient and was probably invented by the Greeks, at least the oldest parody is said to be Homer's "Battle of the Frogs and Mice." The following stanza from a well known parody on Longfellow's "A Psalm of Life" will serve as an example:

"Life is short, and youth is fleeting,
And our hearts, though stout and brave,
Still, like muffled drums, are beating,
Wedding marches to the grave."

PAROS (pā'rŏs), or **Paro**, an island in the Greek Archipelago, one of the Cyclades, situated west of Naxos, from which it is separated by a channel about five miles wide. The island is fourteen miles long and nine miles wide. It has a mountainous surface. Mount Saint Elias, its highest peak, is 2,535 feet above sea level. The coast regions and valleys are fertile. The products consist of cotton, honey, wax, vegetables, fruits, poultry, and sheep. It is famous for its marble and contains many valuable antiquities. The Cretans first colonized it, but it was annexed subsequently by the Persians, and here Miltiades received his fatal wound after the Battle of Marathon. Naussa, on the north coast, is the principal seaport and Parikia, on the west coast, is the largest town, having a population of 2,250. The island has a population of 7,825.

PARRAKEET (păr'rȧ-kēt), or **Paroquet**, the name of a group of parrots, distributed more or less widely in all the continents. They have a long tail and a moderate bill, and walk more easily upon the ground than the common parrot. This class of birds is found in large numbers in Australia and New Zealand, where the *crested parrakeet* is admired for its elegant form and beautiful yellow plumage. The common parrakeet of North America extends from North Carolina to Central America and sometimes moves northward as a summer visitor. These birds are noisy and tame, hence fall an easy prey to their enemies.

PARRHASIUS (păr-rā'shĭ-ŭs), eminent Grecian painter, born at Ephesus near the close of the 4th century B. C. He lived and practiced his profession in Athens, where the inhabitants conferred upon him the rights of citizenship. It is related by Seneca that he procured a prisoner captured by Philip of Macedon, whom he crucified in his studio for the purpose of securing a copy from life to convey the expression of agony to his famous painting, entitled "Prometheus Chained," but the story is unfounded. Another writer associated him with Zeuxis. The latter had painted a picture of grapes so excellently that birds came to peck at them, and, when Parrhasius was called on to rival this production, he asked Zeuxis to draw aside a curtain to examine his picture. The latter found to his astonishment that the curtain was itself the picture. Hence Parrhasius deceived Zeuxis, while the latter only deceived birds. Parrhasius was a prolific painter of various natural and historical scenes, and some of his works are still extant. Among his best known works are "Meleager and Atalanta" and "Ulysses Feigning Insanity."

PARROT (păr'rŭt), a genus of tropical birds classed with the climbers. The genus includes many beautiful species, most of them being distinguished by their brilliant and gaudy plumage. They have a hooked bill and live largely in trees, in which the bill aids them in climbing. On the ground they are peculiarly awkward. The food consists mostly of seeds and fruits, but some species feed on the tender parts of plants and bulbs. In size they vary from the *love birds*, a species not larger than

sparrows, to the *great macaw,* which is fully three feet in length. They are seen principally in flocks, build their nests in trees, and attain to a great age, often from 50 to 75 years. The voice is coarse and harsh, and they can be taught to imitate speech with peculiar exactness. Though docile and affectionate when domesticated, they show an irritable temper when aggravated. The *gray parrot* is a native of West Africa and develops a high degree of skill in imitating the human voice. The *Carolina parrot* is native to the United States and the *green parrot* is found in South Africa. Other species include the *cockatoo, lory, parrakeet,* and *lorikeet.* See **Cockatoo; Parrakeet.**

GRAY PARROT.

PARROTT, Robert Parker, inventor, born in Lee, N. H., Oct. 5, 1804; died in Cold Spring, N. Y., Dec. 24, 1877. In 1824 he graduated from the West Point Military Academy, where he was assistant professor of mathematics and natural philosophy for five years, and in 1831 entered the military service, taking part in the Creek War of 1836. He was made superintendent of ordnance at West Point in 1836. While in charge of the cannon foundry of that institution he invented the rifled cannon known by his name, which was used by the government in the Civil War. Subsequent to the war he became an official in several industrial enterprises.

PARRY (păr'rĭ), **Charles Hubert Hastings,** composer, born at Bournemouth, England, Feb. 27, 1848. He was sent to a private school at Malvern when seven years of age, and later attended the Twyford School. In 1867 he graduated in music from Exeter College, Oxford, and subsequently was granted the degree of master of arts. At first he engaged with a business house, but after three years devoted himself entirely to music. In 1883 he was made a chorus leader at Oxford University, and subsequently received the degree of musical doctor from Cambridge, Oxford, and from Dublin. Queen Victoria knighted him in 1898. His compositions are largely for orchestral instruments, both solo and concerted. Among his productions are "Intermezzo Religioso," "The Glories of Our Blood and State," "The Lotus Eaters," "Prometheus Unbound," and "Ode on Saint Cecelia's Day." He died Oct. 7, 1918.

PARRY, Sir William Edward, navigator and explorer, born in Bath, England, Dec. 19, 1790; died at Ems, Germany, July 8, 1855. He was the son of a physician who designed that he should study medicine, but in 1806 joined the navy and four years later became lieutenant, in which capacity he commanded a ship to the Arctic seas for the purpose of protecting the British fisheries. In the War of 1812 he was dispatched to blockade the United States coast, making an expedition up the Connecticut River in 1813, and subsequently remained in American waters until 1817. In 1818 he commanded the *Alexander* on a voyage to discover the northwest passage, explored Barrow Strait in 1819, and subsequently spent nine years in exploring the Arctic Ocean and endeavoring to reach the north pole from Spitzbergen. The honor of knighthood was conferred upon him in 1829, and soon after he became commissioner of agriculture in Australia. In 1834 he returned to England, where he became comptroller of steam for the royal navy. In 1852 he was made rear admiral and the following year was appointed lieutenant governor of Greenwich Hospital. His death occurred while he was at a health resort in Germany. He published "Lecture on Seamen," "Nautical Astronomy at Night," and "Parental Character of God."

PARSEES (păr'sēz), **Fire Worshipers,** or **Guebres,** the name by which the modern followers of Zoroaster are known. Their religion is founded upon the dogma that there are two primeval causes of the real and intellectual world—the *Vohu Mano,* or Reality, and the *Akem Mano,* or Nonreality—while their moral philosophy is based on the trinity of Thought, Word, and Deed. From the theory of the two primeval causes of reality and nonreality developed, after the time of Zoroaster, the supposition that there are two gods to be worshiped, one of good and the other of evil. That the soul is immortal was one of the principal tenets long before that belief came to be general among the Semites, and they had a conception of future reward and punishment much in advance of the Hebrews. The good deity is known as Ormuzd, or Ahurâ-Mazda, whose symbol is fire, and on this account they hold a flaming fire in great reverence. Their religion spread rapidly throughout Asia. At the time Alexander the Great invaded Asia their priests numbered fully 40,000 and their sacred book, the Zend-Avesta, was widely circulated. The Persians under Artaxerxes looked with favor on the religion of Ormuzd mainly to secure the influence of the Parsees. It flourished until in 651 A. D.,

when the Persians were defeated near Ecbatana by Caliph Omar, after which they suffered greatly under the extensive persecutions of the Mohammedans.

Many of the Parsees fled to India in the early part of the 8th century, where fully nine-tenths of the followers of that religion now reside. Among the peculiarities are included the custom of not eating any food cooked by a person of a different religion. Their food is largely vegetable; their worship is in fire temples, in which altars are maintained and the sacred fires are burning continually; and they recognize only their own caste and creed in contracting marriage. They do not bury their dead, but expose them on a so-called *temple of silence,* where vultures devour the flesh and the bones fall through a grating into a pit below. These towers are about 25 feet high, and the corpse is placed on the grate through a door at the side of a wall that surrounds the upper portion. The Parsees are considered the most hospitable and industrious class of India, and a large per cent. of the business is at present in their hands. The latest estimates place the number of adherents to their faith in India at 73,250. Persia has 8,500 Parsees. They are notably eager to secure an education for their children in the public schools and other institutions.

PARSLEY (pärs'lĭ), a hardy biennial plant native to Europe, with pinnate leaves and fleshy roots. It is grown extensively in gardens for flavoring soups and garnishing meats and has been naturalized in all the continents. The species with curled leaflets is preferred for flavoring and the roots as well as the leaves are used for that purpose. A species known as *Hamburg parsley* has a root similar to that of the carrot or parsnip, and is grown in some parts of Europe and America as a substitute for these vegetables.

PARSNIP (pärs'nĭp), a plant found native in Western Europe, but now grown for its root both for table use and for cattle. The root has a sweet taste and nutritious qualities, the flowers are yellowish, and the stem is furrowed and bears smooth leaves. If planted in a moderately moist and fertile soil, this plant will spread rapidly and become troublesome as a weed, but it is larger and more palatable when cultivated. Soil that inclines to sand rather than to loam produces the most highly flavored roots. In a moderately temperate climate the cultivated plants may be left in the ground during the winter, as the roots are not injured by freezing, and when wintered in this way they are suitable for use early in the spring. However, it is best to dig them in autumn in the colder sections, keeping them for use in a cool and dry cellar. The roots of some species are recommended as food for milch cows, since they contain a high per cent. of saccharine substances.

PARSONS, a city of Kansas, in Labette County, on the Big Labette River, 135 miles south by west of Kansas City. It is on the Saint Louis and San Francisco and the Missouri, Kansas and Texas railroads and is surrounded by a fertile farming country, which produces cereals, grasses, and fruits. The noteworthy buildings include the high schools, the State epileptic hospital, the M. K. T. Hospital, the Masonic Temple, the Y. M. C. A. building, and many fine churches. It has extensive machine shops and railroad offices. Among the manufactures are furniture, plows, ironware, flour, edged tools, and utensils. Coal and natural gas are obtained in the vicinity. It was platted in 1871 and incorporated the same year. Population, 1905, 10,789; in 1925, 14,839.

PARSONS, William Barclay, civil engineer, born in New York, April 15, 1859. He descended from a family whose ancestors took part in the War of Independence and had the advantages of a thorough education. In 1879 he graduated from Columbia College and three years later completed a course as civil engineer in the School of Mines of Columbia University. Soon after leaving the university he became an engineer for the Erie Railroad, and subsequently practiced his profession in New York City as an independent engineer. In 1891 he was employed as deputy chief engineer of the Rapid Transit Commission, and was raised to the position of chief engineer two years later. While employed by this commission he undertook the important work of making plans for a vast scheme for underground rapid transit. Besides proposing and outlining this system in the American metropolis, he proceeded to China to make a survey for a railway between Hankow and Canton. President Roosevelt made him one of the commissioners to build the Panama Canal, and the British government appointed him a member of the commission of three to examine the details of the traffic in London, both railway service and underground transit, including the problems of vehicular traffic and new and widened streets. He served a term of years as trustee of Columbia University and was active as a member of the leading engineer societies of America and Europe.

PARSONS' CASE, a celebrated cause at law won by Patrick Henry in the court of Hanover County, Virginia, in November, 1763. It involved the constitutionality of the so-called Option Law, or Penny Act, passed by that colony in 1758. This law compelled each parish minister to receive the value of 16,000 pounds of tobacco, which had been fixed as the salary of a clergyman, in paper money of the colony. At that time the colonial money was greatly depreciated, hence the law worked an injustice in that it compelled the ministers to accept much less than the market value of the tobacco. An appeal was taken by the clergy, but the crown vetoed the law. Rev. James Maury, a clergyman, sued for damages and retained

Patrick Henry as counsel. He made an eloquent plea to the jury and obtained one penny as damages for the plaintiff. The early success of Henry was based largely upon this case, but the conservative element in the colony looked upon his remarks at the trial as treasonable.

PARTHENON (pär'thĕ-nŏn), a noted temple of Greece, situated on the Acropolis at Athens. The ruins of this structure indicate that it constituted a splendid specimen of architecture. It was dedicated to Athene, the goddess of wisdom and armed resistance, and in it was a world-renowned statue by Phidias, which ranked second only to that of Zeus by the same eminent artist. This statue was 39 feet high and was composed of ivory and gold. The majestic beauty of its architecture constituted the chief attraction of the temple, although Greece had many other similar buildings of interest. The Parthenon was built in the Doric style of Pentelic marble. Originally it had eight columns on each front, 46 in all, of which 32 still remain. The structure had a length of 228 feet, was 101 feet wide, and was 64 feet in height. The Christians used it as a church for many years, but later it became a Moslem house of worship. It remained in good condition until 1687, when the Turks used it as a magazine, and an accidental explosion of a quantity of powder brought it to its present state of ruin. Specimens of sculpture from the Parthenon have been taken to the museums of many countries.

PARTHIA (pär'thĭ-à), an ancient empire in the region of Asia which lies southeast of the Caspian Sea, formed of part of the territory now included in Persia. Originally it was a small country, inhabited by the Parthians, but later its boundaries were extended to include the greater part of the modern Kohistan, Khorassan, and the Great Salt desert. The Parthians were of Scythian descent, if their own tradition is to be relied upon, but some modern writers connect them with the Iranians. At an early date they were made subject to the Persians, and in the expedition against Greece they constituted a part of the army of Xerxes. Alexander the Great united Parthia and Hyrcania into one satrapy, but in 250 B. C. they became independent, when they extended their dominion to the Indus and the Persian Gulf. The Romans under Crassus invaded their territory in 53 B. C., but they were completely defeated and their leader was slain. However, they defeated the Romans under Antony. Later their country was invaded by the Persians and in 228 A. D. it became a part of the new Persian Empire.

PARTIES, Political. See **Political Parties.**

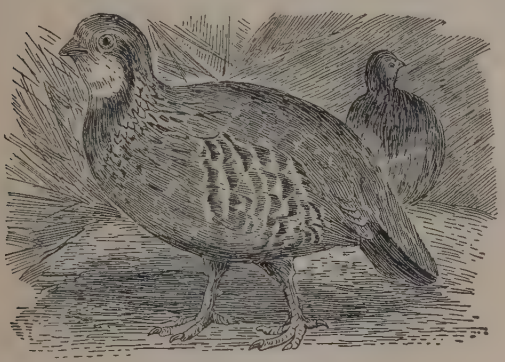
PARTNERSHIP (pärt'nĕr-shĭp), an association of two or more persons for the purpose of combining their labor and capital in the conduct of business, with the agreement to divide the profits and share the losses in certain proportions. It may be confined to a specific purpose or a single transaction, but when not so *limited* it is said to be a *general partnership*. Usually a written contract is the basis of a partnership, but it may be founded upon an oral agreement or even established by implication, meaning that the acts of the parties concerned are such as to lead others to the belief that they are in partnership. A partnership may be for an indefinite time, or it may be limited by a written contract or agreement, and in some cases it is stipulated under what conditions a member may withdraw, or the entire association may dissolve by mutual consent or otherwise. The members who are active in the conduct of the business as principals are known as *real* or *ostensible* partners, while the terms *nominal, dormant,* or *silent* are used to designate those who are not actually interested in the business, or are passively concerned, either permitting their names to be used as an aid in the business or furnishing some financial assistance without giving their time to the management of the partnership.

The greater share of business conducted by companies is managed by corporations instead of mere partnership organizations, since the law in most cases is such that the liability under the former is looked upon as the more equitable. In a partnership each member is liable for the full indebtedness of the firm, and this liability extends alike to real and nominal members during the period in which the association to which they belong is in business. However, this liability extends only to matters of business that relate strictly to the partnership. Each partner is limited by the agreement in the transaction of business, but may bind the firm to the discharge of large obligations, and each individual member as well as the partnership are liable to the extent of the liability incurred. Even if the acts of a partner are fraudulent as regards the others, the general rule is that parties transacting business with the firm are fully protected. An action at law is usually against the individual partners, but in some instances, as in many of the states, the name of the firm as well as that of the partners appears in the cause. If the partnership is dissolved by mutual consent or otherwise, the rule is to first pay the general creditors, then each partner the amount due to him from the firm, and then each member the proportion of capital invested. Finally the balance is distributed to the partners in proportion as the profits are divided.

PARTON (pär'tŭn), **James,** American author, born in Canterbury, England, Feb. 9, 1822; died in Newburyport, Mass., Oct. 17, 1891. He came to the United States in 1827, attended the public schools in New York City, and later taught in the schools of Philadelphia and New York City. His first literary work

was in connection with the New York *Home Journal* and in 1856 he published the "Life of Horace Greeley." In 1875 he removed to Newburyport, Mass., where he devoted the remainder of his life to literary work. His principal productions include "Life of Andrew Jackson," "People's Book of Biography," "Life of Voltaire," "Life and Times of Aaron Burr," "Life of Thomas Jefferson," "Captains of Industry," "Famous Americans of Recent Times," and "Life and Times of Benjamin Franklin." His wife, Sara Payson Eldridge, was born in Portland, Me., July 11, 1811; died Oct. 10, 1872. She first wrote for the New York *Ledger* and later for the *Home Journal,* signing her name *Fannie Fern.* Her writings include "Fern Leaves from Fanny's Portfolio," "Volume of Chit-Chat," "New Story for Children," and "Little Ferns for Fanny's Friends."

PARTRIDGE (pär'trĭj), a genus of birds of the grouse family. It includes a number of widely different species of game birds, many of which are distributed more or less in all of



RED-LEGGED PARTRIDGE.

the continents. In color the *common partridge* is ash-gray with markings of brown and black. The body is round and stout and measures about twelve inches in length. Its wings and tail are short, the bill is heavy, and the tarsi and toes are naked. The flight is rapid for a short distance, but it is not able to endure movement on the wing in extended flight. Ants are the favorite food of young partridges and adults feed mostly on larger insects, seeds, and the cereals of cultivated fields. The young remain with the parents in a convoy until late in the fall, and toward winter packs are formed by the union of convoys. The parents exercise much care in protecting their brood by allowing them to escape into thickets, while the adults attract the attention of the hunter.

The *spruce partridge,* or *Canadian grouse,* has a length of sixteen inches. In this species the male is nearly black, with grey and tawny markings, and the female is brown with grey and black. It is most abundant in New England and the southeastern part of Canada. Other familiar species include the *Arabian partridge* of Western Asia, the *African partridge,* the *Indian partridge* of Southern Asia, the *Greek partridge* of Southern Europe, and the *red-legged partridge,* or *French partridge,* of Western Europe. The *ruffed grouse* of the United States is known as a partridge in some localities. All species are hunted for their flesh, which is a pleasant and nutritious food.

PARTRIDGE, William Ordway, sculptor and author, born in Paris, France, April 11, 1861. He came to the United States at an early age, was educated at Columbia University, in New York City, and later studied in Paris and Rome. His first work is a portrait bust known as "An Old Woman," now in the Corcoran Gallery, Washington, D. C. In 1894 he completed the statue of Shakespeare which is now in Lincoln Park, Chicago. Other noted sculptures include busts of Lincoln and Whittier, bas-reliefs of Sir Henry Irving and Edward Everett Hale, and the Kauffman Memorial, in Washington, D. C. His writings include "Art for America," "The Angel of Clay," "The Song Life of a Sculptor," and "The Technique of Sculpture."

PARTRIDGE BERRY, a small trailing, evergreen herb of the madder family, largely distributed in North America. It has round-ovate, opposite leaves of a dark-green color and white flowers in pairs. It produces a scarlet double berry. The berries are relished by birds. Many species of birds are frequently seen gathering them from the vines in the winter time. A related species common to North America is known as *wintergreen.* The partridge berry is not favored as an edible food, its fruit being almost tasteless.

PARTS OF SPEECH, the term applied to the different classes into which the words of a language are divided, the division being based entirely upon the meaning and use that words have in a sentence. The English language has nine parts of speech, in case we consider the participle and the interjection as separate classes. These embrace noun, adjective, pronoun, verb, participle, adverb, preposition, conjunction, and interjection. A *noun* is the name of anything; an *adjective* is a word used to limit or qualify the meaning of a noun; a *pronoun* is a word used in place of a noun; a *verb* is a word used to express action, being, or state; a *participle* is derived from a verb, partaking of the properties of an adjective, a verb, or a noun; an *adverb* modifies the meaning of a verb, adverb, adjective, or participle; a *preposition* expresses relation between its object and some other word; a *conjunction* connects words, sentences, or parts of sentences; and an *interjection* denotes some sudden or strong emotion. Most grammarians regard the three articles, *a, an,* and *the,* essentially as adjectives and do not class the interjection as a distinct part of speech. *Parsing* consists of naming the part

of speech, telling its properties, pointing out its relation to other words, and giving the rule for its construction.

PASADENA (păs-ȧ-dē'nȧ), a city of California, in Los Angeles County, nine miles northeast of Los Angeles, on the Atchison, Topeka and Santa Fé, the Southern Pacific, and other railroads. It is surrounded by a fertile agricultural and fruit-growing region, which yields cereals, grasses, and fruits. Electric railways furnish communication with Los Angeles and other cities. It is noted as one of the most popular health resorts of the Pacific coast, having a fine climate and a beautiful location. The principal buildings include the public library, the high schools, the California Institute of Technology, the Pacific-Southwest building, and the Green, Raymond, Maryland, and Huntington hotels. Among the manufactures are bread, books, furniture, clothing, canned fruits, wire, earthenware, and utensils. It has many fine gardens and parks. The place was settled by the Spaniards in 1772, but its larger growth dates from 1874. It was incorporated in 1886. Population, 1920, 45,334.

PASCAL (păs'kȧl), **Blaise,** philosopher and mathematician, born in Clermont, France, June 19, 1623; died in Paris, Aug. 19, 1662. He was the son of Étienne Pascal, an educator in Auvergne, and in 1630 he was taken to Paris for the purpose of securing a liberal education. His father personally superintended his training, making a specialty of language work, and later devoted special attention to mathematics and philosophy. In 1639 he wrote a treatise on conic sections, three years later invented a calculating machine, and in 1641 took up the study of religion at Rouen. Soon after he made valuable discoveries in relation to atmospheric pressure and the equilibrium of forces, and by publishing two treatises in relation to physics attained a reputation as a physicist. In 1647 he settled at Paris. He became united to the Jansenists in 1654, and spent most of his time in the monastery of Port Royal, though he did not become an absolute observer of the rigorous rules of that order. He brought upon himself the opposition of the Jesuits by his liberality. Some of his works have been translated into many languages and have gone through a number of editions, particularly his "Letters provinciales."

PASHA (pȧ-shä'), or **Bashaw,** a military title borne by princes and high civic officials in Turkey. This title was formerly bestowed only on princes of royal descent, but now it is conferred upon governors of provinces, military commanders, and others rendering extraordinary service to the nation. Three grades are recognized—pashas of one, two, and three horse tails, so called from the ensigns formerly borne before them as standards when they appeared in public. The first includes governors of minor provinces and brigadier generals; the second, generals of divisions; and the third, viziers and corps commanders. In many respects the office of pasha is quite like that of the ancient Persian satraps. Turkish pashas formerly governed with absolute sway, but now their powers are limited by councils and courts.

PASKEVITCH (pȧs-kȧ'vĭch), **Ivan Feodorovitch,** eminent soldier, born in Poltava, Russia, May 19, 1782; died in Warsaw, Jan. 29, 1856. He was of Polish descent, became a page to Czar Paul, and later entered the regular army. In 1805 he served against the French at Austerlitz, took a prominent part in the campaign of 1812, and in 1825 became commander in chief of the Russian army in Persia, from which country he secured an important command in Persian Armenia. His distinguished services caused the Czar to create him Count of Erivan and to grant him $793,000. Subsequently he conducted several campaigns against the Turks and in 1831 became field marshal, when he suppressed an insurrection in Poland with great vigor. In 1848 he led an army of 200,000 men against the Hungarians and in 1854 was given command of the army of the Danube, but shortly after resigned his position in the army. In 1850 the fiftieth anniversary of his military success was celebrated at Warsaw with much pomp. Several fine statues have been erected in his honor.

PASSAIC (păs-sā'ĭk), a city of New Jersey, in Passaic County, on the Passaic River, twelve miles northwest of New York City and four miles southeast of Paterson. It is on the Erie, the Lackawanna, and the New York, Susquehanna, and Western railroads. The place is beautifully located on elevated ground, affording a fine view over the surrounding country. Among the chief buildings are the Reid Memorial Library, the city hall, the Federal post office, and many fine schools and churches. It has a number of public parks, a system of sanitary sewerage, and pavements of cement, macadam, and asphalt. The manufactures include cotton and woolen goods, chemicals, India rubber, shoddy, machinery, toys, and utensils. The Passaic River rises in Morris County, and, after a tortuous course of about 100 miles, flows into Newark Bay. It affords an abundance of water power and is navigable for a short distance. At Paterson it has a fall of about fifty feet. Passaic was settled about 1679, but was not incorporated until 1873. Population, 1905, 37,837; in 1920, 63,824.

PASSAMAQUODDY BAY (păs-ȧ-mȧ-kwŏd'dĭ), an inlet from the Bay of Fundy, which forms a part of the boundary between Maine and New Brunswick. It receives the water from the Saint Croix and other rivers. The bay is eight miles wide at the entrance and fourteen miles long. Within its confines are several islands. It has a number of fine

harbors and valuable fisheries. The tides affect it considerably, rising about 25 feet.

PASSENGER PIGEON. See **Pigeon.**

PASSION FLOWER, a genus of twining plants, so named from the fanciful resemblance of certain parts of the flower to the objects associated with the crucifixion. The rays of the corona are regarded as representing the crown of thorns; the stigmas, the nails; and the anthers, the wounds. About 200 species are known, many of which are cultivated because of their flowering qualities and for their admirable adaptability for covering arbors and trellises. Most of the species are native to the southern part of the United States, tropical America, and the West Indies. The commonly cultivated species is from Brazil and is a shrubby climber. It has palmate leaves and bears large flowers of a bluish color on the outside and purple and white within. The passion flower native to the United States has three-lobed leaves, bears large flowers, and yields an edible berry of a pale yellow color, about the size of a small apple. Medical properties are secured from the roots, flowers, and leaves of some species.

PASSION PLAYS. See **Miracle Play; Ober-Ammergau.**

PASSOVER (pȧs'ō-vẽr), the principal Jewish festival, instituted to commemorate the event of the Lord's smiting the first born among Egyptians and passing over the houses of the children of Israel. It is related in Exodus that the blood of the paschal lamb was sprinkled on the two side posts and the upper doorpost, and the flesh of the lamb was eaten with unleavened bread and bitter herbs before morning. All the houses in Egypt not so protected were visited that night by Jehovah to slay the firstborn, and the emancipated Jews departed from Egypt the same night. The feast was instituted as an annual one, occurring during the full moon of the month of Nisan, corresponding to March, and included a term of seven days. At present the Passover Feast is celebrated by the Jews, but no lamb is sacrificed. Instead, the meal partakes of the nature of a family feast, in which the shoulder of a lamb is eaten, leaven is put away, prayers and songs are indulged in, and other ceremonies are observed.

PASSPORT (pȧs'pōrt), an official document issued to a person from his own government for protection and license to travel. A passport certifies to the citizenship of the individual holding it and requests foreign governments to grant safe and free passage within their territory. There are many advantages in possessing a document of this character in case of accident or mishap to a traveler, but within late years they are infrequently insisted upon during times of peace. In the United States passports for foreign travel are issued by the Department of State, but a citizen of the Union can obtain one from the legation of the United States in the country in which he may be, or from a consul where no diplomatic representative is located. In Canada they are obtained from the Secretary of State, at Ottawa, on identification and the payment of a fee of $4.00. Passports are not necessary in the United States, Canada, and England, although they are desirable. Germany requires foreigners who desire to reside for a short time in the large cities to be supplied with passports, while they are required in Russia and Turkey. In all the Turkish dominions, including Palestine and Egypt, they must be certified to by a Turkish consular officer before being valid within Turkish territory, but for convenience they may be certified to at New York before sailing.

PASTA (pä'stȧ), **Giuditta Judith,** opera singer, born of Jewish parents in Saronno, Italy, April 9, 1798; died near Lake Como, April 1, 1865. She first studied in her native town and later pursued a musical course at the Conservatoire in Milan, where she was married soon after. She sang with moderate success as early as 1811, but her reputation was made in 1822, when she appeared with much success at Verona. Soon after she was engaged at the Italian Opera in Paris, where her singing was greatly admired, and from 1825 to 1830 she remained in that city, but in the meantime appeared successfully at London. In 1832 she accepted an engagement at Vienna, remaining there until the following year, and soon after withdrew from the stage and settled near Lake Como, where she died. Pasta had a pleasing voice, which passed with ease from high soprano notes to deep contralto tones. She was possessed of stately manners and excellent dramatic energy. Her principal rôles were *Nina, Medea, Camilla, Desdemona,* and *Semiramide.* Bellini wrote "La Sonnambula" for her, in which she was much applauded. Her last engagement was at Saint Petersburg, where she received $40,000.

PASTEUR (päs-tẽr'), **Louis,** chemist and biologist, born in Dôle, department of Jura, France, Dec. 27, 1822; died Sept. 28, 1895. He studied at the Jena University, received a degree from the École Normale in 1847, and the following year became professor of physics at Strassburg. In 1854 he was made dean of the faculty of sciences at Lille, three years later became scientific director of the École Normale in Paris, and in 1867 was appointed professor of chemistry at the Sorbonne. Pasteur was not only an able instructor and lecturer, but ranks among the most eminent chemists and biologists of Europe. Among his many noted discoveries are the causes of certain deteriorations of wine and how they may be prevented, the bacilli causing anthrax in cattle and a cure by inoculation, the cause of hydrophobia by a microbe in the nerve centers with its pre-

vention and cure by a cultured form of the same microbe, and the cause and cure of the diseases of the silkworm.

The silk industry of France had suffered great losses by widespread diseases affecting the silkworms and, in 1865, it was almost ruined. Pasteur found that the blood of these insects was affected by disease germs which could be easily traced from the egg through the larval and chrysalis forms to the adult. He discovered that the disease is to be attributed to unhealthy moths, which are to be destroyed as a preventive of the disease in new generations. He founded the Pasteur Institute in Paris in 1888 for the treatment of rabies, and two years later a similar institution was established in New York City. Much of his attention during his later years of activity was devoted to a study of splenic fever in man, and to cholera in fowls and other animals, in both of which he announced valuable additions to scientific knowledge in the discovery of the treatment and culture of the bacilli attending those diseases. He was honored by all the leading countries and societies of the world, and his seventieth birthday was celebrated in 1892 by an official assembly at the Sorbonne. He contributed to many periodicals and wrote many excellent treatises, including "Les microbes," "Nouvel exemple de fermentation," and "Etudes sur le vin."

LOUIS PASTEUR.

PASTORAL POETRY, the name applied to poetry which relates largely to rustic life. Though concerned largely with topics related to rural scenes, it conveys the interests and emotions of the poet and the society which he frequents rather than the locality. The literature classed as pastoral poetry includes plays, idyls, eclogues, and romances, in which shepherds and other country folks have prominent mention. Theocritus, one of the earliest pastoral poets, treats in an artistic way the habits of life in Syracuse in his "Idyls." In these writings he made use of pastoral dialogues as a veil for his own sentiments and those of other persons in the society with which he was associated. The pastoral idea is largely represented in the literature of Rome, especially in the "Eclogues" of Virgil. Recent literature is not rich in the treatment of pastoral subjects, or with poetry which belongs to this class, but it is well represented in the writings belonging to the middle and modern periods of European authors. To this class belong Goethe's "Hermann and Dorothea," Spenser's "Shepherd's Calendar," Shakespeare's "As You Like It," and Fletcher's "Faithful Shepherdess."

PATAGONIA (păt-à-gō′nĭ-à), the name generally applied to the most southern region of South America, lying south of the Negro River. It is bounded on the east by the Atlantic, south by the Strait of Magellan, and west by the Pacific. The total area is estimated at 322,550 square miles, of which 16,050 square miles are included in the islands along the southern and western coasts. A treaty made in 1881 divided the region between Chile and Argentina, the former securing 62,930 square miles and the latter 259,620 square miles. The extensive archipelago of the Tierra del Fuego Islands is separated from the mainland by a coast frontage of 365 miles on the Strait of Magellan. With it are included many rocky peninsulas.

The eastern part belongs to the vast steppe-like plains extending along the Atlantic, which rise abruptly in successive terraces. The soil is more or less stony and the vegetation consists of herbage and thorny brushwood. Rainfall is very scant in some regions. Many salt marshes and lakes are situated in the west central part. The drainage is principally by the Negro, Chico, Deseado, and Chubut rivers, all of which have a course toward the east and flow into the Atlantic. Among the animals are the puma, guanaco, birds of song, and water fowl. Otters, fish, shellfish, seals, and sea elephants are found along the coasts. The western part is mountainous and rugged, including an extension of the Andean system. Forests are abundant in this section. The prevailing winds are from the west. As a whole, the winters are extremely cold, and the summers are moderately warm. The mineral deposits are similar to those common to Chile.

Patagonia is inhabited principally by Indians, who subsist mainly on the chase and by herding small droves of cattle on the pastoral lands. They belong to the Tehuelches, or Patagonian Indians, and consist of two tribes, known as the Northern and Southern. These Indians are decreasing rapidly in number. In the summer season they are seen on the plains in charge of herds of cattle and fishing along the coast, while in the winter time they seek refuge in the forests and mountains toward the west. Colonies have been established by both Argentina and Chile, and the latter country supports a penal settlement within the region.

The region was first sighted by the Spaniards under Magellan in 1520 and was explored by De Isla in 1535. Spanish settlements were founded as early as 1580, but these settlers and others located subsequently left the region to settle farther north, where the climate is less severe and the inducements for extensive investments are more encouraging. A Welsh colony was founded at the mouth of the Chubut

in 1865, but it proved unsuccessful. The settlements that do exist were established almost exclusively by people from regions located farther north in South America. It is probable that large tracts will remain unpopulated for centuries.

PATAPSCO (pȧ-tăps'kō), a river in Maryland, which rises near the boundary line of Pennsylvania and, after a course of eighty miles toward the southeast, flows into Chesapeake Bay, fourteen miles south of Baltimore. It supplies an abundance of water power and is navigable to Baltimore for large vessels. The valley of the Patapsco is fertile and its fisheries are productive.

PATCHOULI (pȧ-chōō'lĭ), a plant native to Southern Asia, especially to India and the East Indies. It is cultivated for its heavy brown oil, called *Patchouli,* which is obtained by distillation. This product is used for perfumery and for keeping moths and other insects from linen and woolen goods. The mattresses and shawls imported from Asiatic countries derive their peculiar odor from the oil of this plant.

PATENT, a government grant to an inventor, whereby he secures for a limited time the exclusive right to make, use, and sell any new machine, process, or composition of matter, or any new and useful improvement. Nearly all civilized nations encourage and protect inventive skill and industry by granting patents, and some even go so far as to grant exclusive privileges for generations to the producers of new additions to mechanics, arts, and literature. It is specially provided in the Constitution of the United States that Congress shall have power "to promote the progress of science and useful arts, by securing for a limited time to authors and inventors the exclusive rights to their respective writings and their respective discoveries." The first patent law was inspired by Thomas Jefferson and passed by Congress in 1790. At present fully 45,000 applications for patents are made annually and about one-half fail to secure an issue.

The patents issued in different years since the enactment of the first patent law in the United States take numerical rank as follows:

1790	3	1855	2,013
1795	12	1860	4,819
1800	41	1865	6,616
1805	57	1870	13,321
1810	223	1875	14,837
1815	171	1880	13,947
1820	155	1885	24,233
1825	204	1890	26,292
1830	544	1895	22,057
1835	757	1900	30,934
1840	473	1905	30,399
1845	503	1918	38,598
1850	993	1922	41,401

The laws of the United States formerly discriminated against foreign applicants, when a residence of one year was required, and the fee for foreigners was fixed at from $300 to $600, but in 1861 all discrimination was repealed, except that against aliens coming from countries discriminating against citizens of the United States. In 1836 Congress appropriated $108,000 to construct the present patent office, and in December of the same year a destructive fire destroyed practically all the contents of the patent office. In the same year the patent law was revised and improved in many respects. However, a general revision of the statutes occurred in 1870. In 1877 another destructive fire occurred, doing damage to the amount of $60,000.

To obtain letters patent a distinct specification must be made by the applicant, giving a full and complete description of his invention. Drawings and models must be made in all cases where such are possible, and these must be deposited with the Commissioner of Patents. The fee to be paid by the patentee is $35, of which $15 must accompany the application, and the balance of $30 must be paid on an issuance of the patent. The fee of $15 remitted with the application is retained for making search through the patent office to ascertain whether there is not some conflicting patent already in existence, and it is not returned in case letters patent are refused. Patents are issued for a term of seventeen years and cannot be renewed.

The patent office belongs to the Department of the Interior and the commissioner is appointed by the President, subject to confirmation by the Senate. Information on this subject is sent free of charge by mail to any one requesting the patent office to do so. Pamphlets treating of rules of practice in the United States patent office, patent laws, and laws relating to the registration of trade-marks and labels are among the publications issued for free distribution.

The patent office in Canada is a branch of the Department of Agriculture, the Minister of Agriculture being the Commissioner of Patents. It is required that the construction or manufacture be carried on in Canada, beginning within two years from the issue of the patent, as otherwise it becomes void. The patent is granted for eighteen years, but the applicant may secure one for only eight or twelve years, if he chooses, and have it extended to the full term afterward by paying the remainder of the fee. The fee for six years is $20; for twelve years, $40; for eighteen years, $60. In Germany the fee is $5 and $7.50 before issuing the patent; in Australia, $20; in France, $20; in Great Britain, $25; and in Russia, $75.

PATERSON (păt'ĕr-sŭn), a city of New Jersey, county seat of Passaic County, on the Passaic River, popularly called the "Lyons of America." It is fifteen miles northwest of New York City, on interstate highways, and has communication by the Erie, the Lackawanna, and the New York, Susquehanna and Western railroads. Several electric lines extend from the city to various points within the State. It occupies a site of nine square miles, located

largely in a curve of the river, which has a fall of fifty feet at one place and a descent of twenty feet a short distance below the falls, affording extensive water power. The river is spanned by several bridges and the streets are broad and well paved, chiefly with asphalt, cement, and macadam.

The city has many fine public buildings, including the post office, the city hall, and the county courthouse. It has a public library with 85,500 volumes. Four large and 23 smaller parks, all finely platted and substantially improved, furnish outdoor recreation. It has several hospitals, charitable institutions, and many public school buildings. All the civic, social, and luncheon clubs are well represented. Many of the business blocks are large and constructed of stone and steel. It has gas and electric lighting, public waterworks, surface and sewer drainage, and well-organized police and fire departments.

Paterson is noted for its extensive manufactures of silk goods, which are produced in larger quantities than in any other city in America. Large interests are vested in bridge building, the production of iron and steel, and in building rapid aëroplane engines. Other manufactures include linen thread, paper, cotton and woolen goods, velvet and braid, flour and meal, and general machinery. The place was founded in 1791 by a society of manufacturers, in which Alexander Hamilton was interested. It was incorporated as a city in 1851, after which it grew rapidly in wealth and commercial influence. Population, 1920, 135,866.

PATERSON, William, financier and founder of the Bank of England, born in Dumfriesshire, Scotland, in April, 1658; died Jan. 22, 1719. He descended from a family in financially poor circumstances and was for a time a peddler in England. In 1688 he established a successful business as a merchant and conducted a large trade with the West Indies from the Bahama Islands, where he resided for a time. Subsequently he settled in London as a mercantile trader and in 1694 projected the Bank of England, of which he became one of the first directors. In 1695 he secured a governmental sanction of the famous Darien Scheme, an enterprise by which he purposed to found a settlement on the Isthmus of Darien and control a large part of the world's commerce. After a few years the enterprise failed and Paterson returned to England broken both in health and fortune. Soon after he became an advocate of the treaty of union between England and Scotland, which was established in 1707. The government granted him an indemnity of $91,205 to cover the losses sustained by him, and he spent the later part of his life in London. He wrote much on economic questions, particularly on free trade. His works were published under the title "The Writings of William Paterson."

PATERSON, William, jurist and statesman, born at sea in 1745; died Sept. 9, 1806. He descended from Irish parentage and was brought to New York at the age of two years. In 1763 he graduated at Princeton, then the College of New Jersey, and was soon after admitted to the bar. He became attorney general of New Jersey in 1776, served in the Continental Congress from 1780 to 1781, and was a delegate to the convention that adopted the Federal Constitution. In the latter he advocated State sovereignty, but favored vesting the common defense in the general government. In 1789 he was elected to the United States senate, but resigned two years later to become Governor of New Jersey. Washington appointed him a justice of the United States Supreme Court in 1793, which position he held until his death.

PATMORE (păt'mōr), **Coventry Kearsey,** poet, born in Woodford, England, July 23, 1823; died Nov. 26, 1896. In 1844 he published a volume of poems and shortly after became a librarian in the British Museum, where he worked for twenty years. He removed to Hastings in 1868, where he built a large Catholic church, and afterward devoted many years to literary work. His principal publications include "Tamerton Church Tower," "The Angel in the House," "Children's Garland from the Best Poets," and "Autobiography of Barry Cornwall."

PATMOS (păt'mŏs), or **Patmo,** an island in the eastern part of the Grecian Archipelago, 25 miles south of Samos, belonging to the Sporades group. It is about ten miles long and six miles wide and bears evidences of having a volcanic origin. The surface is rocky and barren. Rude agriculture is carried on in a few localities, but the inhabitants engage more largely in fishing. The island is noted for the exile of the Apostle John. It was on this island that he saw the visions contained in the Book of Revelation. John the Divine built a monastery on an elevated mountain in 1088, near which is the small town of Patmos. The island belongs to Turkey, but it is inhabited almost exclusively by Greeks. Population, 1922, 4,063.

PATNA (păt'nä), a city of India, in the Bengal district, on the Ganges River, 285 miles northwest of Calcutta. It is conveniently located along the river and has extensive railroad and steamboat connections with other trade emporiums. Among the manufactures are clothing, utensils, tobacco products, earthenware, toys, linen goods, and wax candles. The city has a large export trade in opium, merchandise, cotton, tobacco, salt, oil seeds, and fruits. Many of the streets are narrow and in the older portion they are tortuous and illy supervised. In the newer parts the streets are wide and regular and contain a number of modern municipal facilities, including electric lighting and rapid transit. The principal buildings include a Roman Catholic cathedral, the Nabob's palace, a Mohammedan college, Patna

College, a number of mosques and tombs, and several educational and benevolent institutions. It is thought that the city was founded about 600 B. C. In 419 B. C. it became the capital of Bahar. Occupation by the British caused an uprising in 1763. At present it ranks among the most important trade centers of Southern Asia. Population, 1922, 136,406.

PATON (pā'tn), **John Gibson,** missionary, born in Dunfermline, Scotland, May 24, 1824; died Jan. 29, 1908. After studying a course in theology, he became connected with the Glasgow City Mission, and in 1858 engaged in the foreign missionary field under the Reformed Presbyterian Church. He entered upon a line of successful work in the New Hebrides, where he labored among difficulties with the natives at Tanna until 1862, when their hostility made it necessary for him to leave. Soon after he engaged in the Australian missionary field and in 1865 became stationed on the neighboring island of Aniwa, where he converted all the natives to Christianity by diligent labor in a period of twenty years. In 1892-94 he visited extensively in North America and Great Britain, attending in the meantime the conference of the Presbyterian church at Toronto. His autobiography was edited and published by his brother in 1889.

PATON, Sir Noel, historical painter, born in Dunfermline, Scotland, Dec. 13, 1821; died Dec. 26, 1901. He studied at the Royal Academy and in 1845 exhibited a cartoon sketch, entitled "The Spirit of Religion," at Westminster Hall. His oil paintings, entitled "Christ Bearing the Cross" and "Reconciliation of Oberon and Titania," jointly secured a prize of $1,500. Later he produced many paintings that were engraved and in the meantime published two volumes of poems. The best known of his later paintings include "The Pursuit of Pleasure," "Dante Meditating the Episode of Francesca, "Home from the Crimea." "In Memoriam," "Luther at Erfurt," and "The Man of Sorrows." He illustrated Aytoun's "Lays of the Scottish Cavalier."

PATRAS (pă'trăs), a seaport city of Greece, capitol of the nomarchy of Achaia, on the Gulf of Patras. It is located in a fertile plain, about 12 miles southwest of Lepanto, and near it is the site of an ancient acropolis. The streets are wide and well paved, and the city has electric and gas lighting, sewerage, and waterworks. A breakwater protects the harbor, which is the seat of a large trade in wine, currants, and fruits. Patras is an ancient city and was formerly the chief commercial center of the Peloponnesus. Population, 1916, 42,380.

PATRIARCH (pā'trĭ-ärk), a term applied originally to the progenitors of early tribes of mankind, specially to the antediluvians named in the Bible and to the early Hebrews, including Abraham, Isaac, and Jacob. After the destruction of Jerusalem, the term became the title of the principal officer of the Sanhedrim, in which executive authority was vested over the Jews of Syria and Persia. In the 5th century it came to be applied to the bishops of Alexandria, Antioch, and Rome. The patriarch of Constantinople became superior to those of Alexandria and Antioch at the time that city was made the seat of the empire, while the patriarch of Rome became the supreme pontiff of the west. Later a division resulted in the Latin church on account of conflicting authority between the patriarch and the pontiff of Rome, which gave rise to the Roman and Greek churches. The primate of the Greek Church in the Ottoman Empire at present is the patriarch of Constantinople, whose title is ecumenical or general patriarch.

PATRICIANS (pă-trĭsh'ănz). See **Plebeians.**

PATRICK (păt'rĭk), **Saint,** the apostle of Ireland, probably born at Nemthur, in the British-Roman province of Valentia, in 396; died in Down, Ulster, March 17, 493. Writers generally express some uncertainty as to the place of his birth, but it is thought that his father had a small landed possession near the modern Dumbarton, on the Clyde River. A band of pirates seized him in his sixteenth year and sold him as a slave on the opposite coast of Ireland to an Irish chief, who was located in the region of the present county of Antrim. After serving six years as a herder of cattle, he escaped to France, where he entered a monastery at Tours. He visited Rome in 431 and was sent the following year by Pope Celestine I. as a missionary to Ireland. His work in Ireland was productive of remarkable results. After visiting all parts of the kingdom, he established his see at Armagh about the year 454, and it is asserted that he held several synods and secured the appointment of two bishops. It is said that he personally baptized 12,000, established 365 churches, and ordained a large number of priests. Only a few of his writings are extant, the most important being his "Confession" and a letter addressed to Coroticus, a Welsh chieftain, who was noted as a persecutor of Christians. Both these are rude in construction but have historical value.

PATRONS OF HUSBANDRY. See **Grange.**

PATROONS (pă-trōōnz'), the name of a class of Dutch settlers in the colony of New Netherlands, afterward New York, who enjoyed certain manorial rights to their lands. These rights were granted to promote colonization in Amerca. They gave the proprietor, who was known as the *patroon,* the absolute title to a tract of land extending a distance of eight miles on both sides of a navigable stream, or sixteen miles if on one side, the tract extending inland as far as the country might be developed. The colonists were bound to the wealthy grantees for a certain number of years,

hence the estate gave rise to a kind of feudal system. Changes were made from time to time, owing to contentions between the patroons and the colonies, but traces of the system remained until 1847, when the relations between tenant and landlord were modified as a result of the antirent agitation.

PATTERSON (păt'tĕr-sŭn), **Daniel Todd,** naval officer, born on Long Island, N. Y., March 6, 1786; died Aug. 15, 1839. He entered the navy as midshipman in 1800 and soon after was taken prisoner by a flotilla of gunboats sailing under the colors of Tripoli, in which country he remained a prisoner until 1805. He commanded the naval forces at New Orleans in 1814, and received the thanks of Congress for efficiently coöperating with General Jackson against the British. In 1825 he was given command of the *Constitution,* served in the Mediterranean from 1826 until 1828, and in 1836 became commandant at the Washington navy yard. His son, C. P. Patterson, born Aug. 24, 1816, graduated at Georgetown College, Kentucky, in 1836, and was commander of the Pacific mail steamer *Oregon* from 1850 to 1861. He held many important government positions as inspector and commissioner. His death occurred Aug. 15, 1881.

PATTERSON, Elizabeth. See **Bonaparte, Elizabeth Patterson.**

PATTERSON, Malcolm Rice, public man, born at Somerville, Ala., June 7, 1861. He graduated at the Christian Brothers College, Memphis, and afterward studied law at the Vanderbilt University. In 1883 he was admitted to the bar and began the practice of law in Tennessee. The following year he was defeated as a candidate for the Legislature, but was chosen attorney for Shelby County soon after. In 1900 he was elected to Congress as a Democrat, where he became influential as a legislator, and was reëlected in 1903 and 1905. He was elected Governor of Tennessee in 1906 and was reëlected two years later. While Governor of his State, in 1908, he vetoed the prohibition law passed by the Legislature, believing that the then existing local option laws were sufficient in the way of temperance regulation. Within this period occurred many disturbances on account of the *night riders,* owing to local conflicts among the tobacco growers. However, his administration of the office was eminently successful and met the approval of a large majority of the people.

MALCOLM RICE PATTERSON.

PATTESON (păt'tĕ-sŭn), **John Coleridge,** missionary bishop, born in London, England, April 1, 1827; slain Sept. 20, 1871. He was the eldest son of Sir John Patteson, graduated at Oxford in 1848, and in 1852 became fellow of Merton College. He was made curate of Alfington, Devonshire, in 1853, and the following year was ordained a priest. Shortly after he sailed as missionary to the Melanesian Islands in the South Pacific, where his successful work caused him to be consecrated bishop of Melanesia in 1861. He gained many friends among the natives and spread Christianity effectually, but was killed by a native of the Santa Cruz Islands as the result of an endeavor to quash the slave trade.

PATTI (păt-tē'), **Adelina Maria Clorinda,** opera singer, born in Madrid, Spain, March 19, 1843. Both her parents were operatic singers. They brought her to New York City when she was a child. Her brother-in-law, Maurice Strakosch, instructed her in singing, and at the age of seven years she appeared at a concert in New York. Soon after she made a tour with Strakosch and Ole Bull in America, and later accompanied Maurice Gottschalk, the pianist, on a tour to the West Indies. She appeared in New York as *Lucia* in 1859, as *Amina* in "La Sonnambula" in London in 1861, and soon after visited the principal cities of Europe, Mexico, and South America. In 1868 she married Marquis de Caux, but was divorced from him in 1878, and in 1886 married Ernesto Nicolini, who died in 1898. The following year she married Baron Cederström, a Swedish nobleman. She made successful tours in the United States in 1881 and 1893, and soon after erected a theater in Wales, at Craig-y-Nos, her favorite residence. Patti is noted for her rich tones of voice, artistic skill in impersonation, and pleasing manner. She died Sept. 27, 1919.

ADELINA PATTI.

PATTISON (păt'tĭ-sŭn), **Dora Wyndlow,** noted nurse, born in Hauxwell, England, Jan 16, 1832; died Dec. 24, 1878. She was a sister of Mark Pattison and in 1861 became a school teacher at Little Woolston. The devoted work of Florence Nightingale impressed her with the desire of aiding others, and in 1864 she joined the sisterhood of Good Samaritans at Coatham to labor as a nurse in North Ormsby and Walsall. During epidemics of smallpox

in 1868 and in 1875 she rendered efficient service, but died three years later on account of over-exertion. In 1886 a monument was erected to her memory by the workingmen.

PATTISON, Mark, scholar and author, born at Hornby, England, in 1813; died at Harrow Gate, July 30, 1884. He graduated at Oxford in 1837, two years later became a fellow of Lincoln College, and in 1861 was elected rector of that institution. Both as teacher and writer he attained to eminence, being greatly assisted by Emilia Frances Strong, whom he married in 1862. Among his principal writings are "Satires and Epistles," "Sonnets of Milton," "Report on Elementary Education in Protestant Germany," "Tendencies of Religious Thought in England," "Essays and Reviews," "Memoirs," "Essays," and "Sermons." He contributed to many periodicals and edited Pope's "Essay on Man."

PATTISON, Robert Emory, public man, born at Quantico, Md., Dec. 8, 1850; died Aug. 1, 1904. His parents removed to Philadelphia, where he attended the public schools and afterward took up the profession of law. In 1877 he was elected city comptroller and was reëlected to the same position. He was elected Governor of the State as a Democrat in 1882, the first representative of that party who held the office in thirty years, and was again elected in 1890. His administration was energetic and eminently satisfactory.

PATTON (păt't'n), **Francis Landey,** clergyman and educator, born in Warwick, Bermuda Islands, Jan. 22, 1843. He studied at the Toronto University, Canada, took a theological course in the same city, and afterward studied at Princeton Theological Seminary, New Jersey, from which he graduated in 1865. He filled important charges as pastor in New York and Brooklyn from 1865 to 1874, and served as pastor in the Chicago Jefferson Park Presbyterian Church from 1874 until 1881. In the latter year he became a professor at the Princeton Seminary and afterward was made its president. Patton ranks as a prominent theological writer and speaker, and was honored by degrees conferred by a number of the leading educational institutions of America. He contributed to many periodicals and is the author of a number of authoritative works on theology and ethics. His chief works include "Inspiration of the Scriptures" and "Summary of Christian Doctrine."

PAU (pō), a city of France, capital of the department of Basses-Pyrénées, 103 miles south of Bordeaux. It is located on the Gave de Pau, which is crossed by a number of bridges. Several steam railways and electric lines furnish communication to many points in France. The chief buildings include the palace of justice, a museum, and two Gothic churches, those of Saint Martin and of Saint James. The public library has 55,000 volumes. Henry IV. resided for some time in a castle near the city, in the 14th century, and the site is now occupied by interesting and imposing buildings. It has manufactures of linen and cotton textiles, machinery, and wine and is a center of trade in grain and live stock. Many tourists visit here during the winter. Population, 1922, 35,044.

PAUL, the name of five popes, three of whom are treated in articles below. Paul I. succeeded Stephen III. on May 29, 757; died on June 28, 768. During his reign a close alliance with Pepin, King of France, was maintained, and he was canonized on account of his piety and virtues. Paul II. was born at Venice, Italy, Feb. 28, 1418; died July 28, 1471. He succeeded Pius II. on Aug. 31, 1464. See **Pope.**

PAUL, Saint, distinguished apostle of Christianity, born at Tarsus, in Cilicia, about 3 A. D.; suffered martyrdom about 67 A. D. The place and date of his birth and death are largely traditional, good authorities disagreeing somewhat. It is generally held that he was of pure Jewish descent and that he belonged to the tribe of Benjamin. His early name was Saul, which had been given to him in memory of the first Jewish kings, and he studied under the celebrated Jewish rabbi, Gamaliel, at Jerusalem. His training was that of a teacher. He became a member of the sect of the Pharisees, and with his associates was a persecutor of the Christians. The Pharisees showed much jealousy in their opposition to the followers of the Nazarene, since they represented the scholarship spread by the 480 synagogues, while the new converts to Christianity quite generally were uneducated. He witnessed the martyrdom of Stephen. In the Acts of the Apostles are recounted the incidents attending his conversion by a vision of Jesus, which blinded him for some time. The next three years of his life were spent in Arabia, and, when he returned, his name was changed to Paul.

The apostolic labors of Saint Paul began at Damascus. Soon after he was joined by Barnabas and the two carried on missionary work in Antioch, Asia Minor, Pisidia, and other regions of Western Asia. Later Paul established churches in various regions of Galatia, Syria, in the islands of the Mediterranean, and in Greece. The most important churches that claimed him as their founder were those of Galatia, Corinth, Thessalonica, and Philippi in Macedonia. He was not only a powerful and effectual preacher of the gospel, but wrote epistles to the different churches established by him and to friends. The epistles of the New Testament assigned to him as author are fourteen, thirteen of which commence with his name and the fourteenth opens abruptly, though the title Epistle of Paul has been prefixed to it. Most critics regard Paul the author of all fourteen, but some think the one without his name prefixed was written by Apollos. Ferdinand Christian Baur (q. v.) regards the Epistle to the Ro-

mans, 1 Corinthians, 2 Corinthians, and Galatians the only ones purely of his authorship.

Saint Paul visited Jerusalem at different times, where he was always severely opposed by the Pharisees, and on the occasion of his fifth visit was placed under arrest and sent for trial before the Roman governor, Felix, at Caesarea, who retained him as a prisoner for two years. It was the privilege of a Roman prisoner to appeal to the emperor, which he did, and he was accordingly sent to Rome, but suffered shipwreck at Malta in the spring of 61. At the Roman capital he was treated with respect, and it is thought that he was acquitted. It is not known whether he left the city, though it is thought that he made several visits to Asia Minor and one to Spain. According to tradition, he suffered martyrdom along with other Christians, who were charged unjustly with aiding to burn Rome in the time of Nero. He is regarded by all Christian sects as the most eminent advocate of early Christianity, the most efficient exponent of the teachings of Jesus. It is doubtful whether in the world's annals is to be found a character that in moral heroism is equal to Saint Paul; certainly none is superior to him.

PAUL III., Pope from 1534 to 1549, born in Carino, Tuscany, Feb. 28, 1468; died Nov. 10, 1549. He descended from a noble Roman family and was liberally educated. His pontificate shows him to have been a man of character and ability. It was his aim to surround himself by the most distinguished cardinals of his time, in which ambition he attained success. Among the notable incidents of his reign are the brief against slavery, in 1537; the bull instituting the Order of the Jesuits, in 1540; the council of Trent of 1545; and the decree of excommunication against Henry VIII. of England, in 1538. He was identified with the struggle of Charles V. against the German Protestants. He had a son and a daughter before becoming a priest, the former of whom was Duke of Parma and Piacenza.

PAUL IV., Pope from 1555 to 1559, born in Naples, Italy, June 28, 1476; died Aug. 18, 1559. He secured a liberal education in Rome, became Archbishop of Chieti, and in 1536 was made cardinal. In 1555 he succeeded Marcellus II. as Pope, in which capacity he showed extremes in censoring and examining books, and was strict in punishing heresy. In the later years of his reign he refused to recognize Ferdinand as Emperor of Germany on the ground that he held his permission necessary to allow Charles to abdicate, and became involved in trouble with Spain by favoring France. He was the first Pope to issue a full official *Index Librorum Prohibitorum* (q. v.). He was a determined opponent of Protestantism, and coöperated with Queen Mary in her efforts to maintain Catholicism in England.

PAUL V., Pope from 1605 to 1621, born in Rome, Italy, Sept. 17, 1552; died Jan. 28, 1621. He descended from a noble family, studied canon law, and in 1596 became cardinal. He succeeded Leo. IX. after an exciting conclave. Among the memorable incidents of his reign is the contention with Venice that clergymen may not be subjected to trial in the courts of law, and in 1606 he placed the whole republic of Venice under an interdict for refusing to yield. The Venetians retaliated by commanding their clergy not to heed the papal censures and banished all refusing to obey. Paul is noted as the pontiff who did more for the improvement of Rome than any other, his works including the building of the Borghese Chapel, constructing fountains and gardens, and improving the streets. He established missionaries in the East and received embassies from India and Japan.

PAUL I., Petrovitch, Emperor of Russia, son of Peter III., born Oct. 2, 1754; assassinated March 24, 1801. His mother, Catharine II., usurped the crown and required him to spend his early life in retirement. He succeeded to the throne on Nov. 17, 1796, at the death of his mother, and at once set at liberty Kosciusko and other Poles in prison at Saint Petersburg. The army regulations were reformed by introducing German discipline. He joined the allied powers against Napoleon, for which purpose he sent a large army under Suwaroff into Italy, and later dispatched an army to France. In 1800 a dispute arose regarding the island of Malta, and he seized the English vessels and goods that were then in the Russian ports. Later an agreement was concluded with Napoleon to invade the British possessions of Asia, but he was assassinated before the project could be accomplished. Napoleon and other French military authorities held the view that the assassination was brought about by English agents, though it was afterward declared that the conspirators were Russians who endeavored to compel him to abdicate, which he refused.

PAULDING (pạl'dĭng), **James Kirke,** author, born in Pleasant Valley, N. Y., Aug. 22, 1779; died April 6, 1860. He attended the public schools of Duchess County and later removed to New York City, where he became associated with Washington Irving in the publication of a humorous work entitled "Salmagundi." It was issued in a series of essays and later he published a second series independently. In 1814 he was appointed to a clerical position on the board of navy commissioners, serving in various capacities until 1838, when he was made Secretary of the Navy in the Cabinet of President Van Buren. His later literary works include "Westward Ho," "The Puritan and his Daughter," "Konigsmarke," "Life of Washington," and "The Dutchman's Fireside."

PAULISTS (pạl'ĭsts), or **Paulist Fathers,** a missionary society of priests in the Roman Catholic church. It was founded in 1858 by Rev. Isaac Thomas Hecker as the Congregation of Missionary Priests of Saint Paul the

Apostle. The headquarters are in New York City, where the society maintains a magnificent church and carries on publication work. Churches are maintained in many cities of the United States, and the missionary work is largely among those who do not profess the Catholic religion. The *Catholic World,* a monthly periodical, is the official organ of the society.

PAULSEN (poul'sẹn), **Friedrich,** philosopher, born in Langenhorn, Germany, July 16, 1846; died Aug. 14, 1908. He studied at the universities of Erlangen and Berlin, and in 1875 was made docent in the latter institution. Three years later he was appointed professor of philosophy and pedagogy. His lectures were widely attended and had marked influence among the students of philosophy in Europe. As a philosopher he is classed with the new school of Kant, and in metaphysics he is a disciple of Fechner. His published works include "Introduction to Philosophy," "Kant as a Philosopher of Protestantism," "System of Ethics," "Work and History of German Universities," and "Treatise Relating to the Theories of Kant."

PAUNCEFOTE (pạns'fo͝ot), **Sir Julian,** jurist and statesman, born in Munich, Germany, Sept. 13, 1828; died May 24, 1902. He studied in Geneva, Paris, and Marlborough College, was called to the bar in 1852, and in 1865 became attorney-general of Hong Kong. Queen Victoria knighted him in 1874, and in the same year he became Assistant Undersecretary of State for the Colonies. Two years later he was appointed Assistant Undersecretary of State for Foreign Affairs, and in 1882 became permanent Undersecretary of State for Foreign Affairs. He served as British delegate to the conference at Paris in 1885 to draw up an act relative to the navigation of the Suez Canal, became British minister to the United States, and in 1893 was made ambassador. In 1894 he was associated with the privy council while on a visit to England, served as delegate to the peace conference at The Hague in 1899, and was raised to the peerage in the same year. His greatest work consists of his part in concluding the Hay-Pauncefote Treaty (q. v.), relative to the transisthmian canal of America.

PAUPERISM (pạ'pẽr-ĭz'm). See **Poor-Laws.**

PAUSANIAS (pạ-sā'nĭ-ạs), Spartan regent and general, son of Cleombrotus and nephew of Leonidas, and commander of the Greek forces in the Battle of Plataea in 479 B. C. In this battle the Persians were defeated and Greece became forever freed from them. In 478 B. C. he commanded an expedition to Cyprus and to Byzantium, from both of which he expelled the Persians, and for the purpose of making himself master of Greece became implicated in treasonable relations with the enemy. He was recalled and tried at Sparta, but was aquitted on account of former services. Soon after he returned to Byzantium to consult with the Persians and to secure the assistance of Xerxes in acquiring control of Greece, and was again recalled and acquitted. Subsequently he incited the Helots to revolt, when the Spartans purposed to arrest him a third time. However, he took refuge in the temple of Athene, but the populace blocked the doors and starved him, his death occurring in 468 B. C. Plistoanax, one of his three sons, became King of Sparta.

PAVEMENT (pāv'mẹnt), the name applied to any covering of stone, brick, wood, asphalt, or cement for walks, roads, and floors of houses. It is used most extensively for improving the streets and highways in or near towns and cities, especially where the natural surface is of a constituency that will render it easily displaced by hoofs, wheels, and the elements. The material which is employed is of a durable character, especially where much heavy traffic is carried. The floors of many public buildings, such as cathedrals and structures occupied by the government, are paved with durable materials of an ornamental design.

The history of pavement is as ancient as that of civilization. It is related that Babylon had paved streets fully 2,000 years before the Christian era. Many streets of Rome were paved with layers of stone, usually two, the lower one laid in mortar or cement, and the upper of stone with a smooth surface. A few of the Roman pavements are still intact and small portions are said to be suitable for use. The vertical edges of stone blocks used in ancient times were cut so as to fit closely, and they were laid upon a solid foundation, usually constructed of lava stone. Paving was not employed extensively during the Middle Ages, but after the 12th century it again received much attention, and at present all well-kept streets in the towns and cities have pavements.

Pavements constructed of stone are the most durable, and this is the material used most extensively in the main business thoroughfares of the large cities. The surface is first cut down to a uniform level, after which a foundation of concrete is built. The stone used chiefly is granite and is cut into rectangular blocks, the vertical edges fitting closely. The blocks are set carefully upon the foundation, the purpose being to obtain smoothness and uniformity in the surface. Many of the outlying streets, especially in the western part of the United States, are paved with a class of hard-burned, or *vitrified,* brick. Formerly they were laid in two courses, the lower one being placed flat upon a well-graded and sanded foundation and the other set on edge, but now brick pavements are constructed almost entirely by setting a course of brick on

edge upon a concrete foundation about six inches thick.

In many places where timber is abundant, wooden pavements are constructed of rectangular or cylindrical blocks. These blocks are about six inches long and are set closely together on the ends, which form a smooth surface. Usually a foundation of boards covered with hot coal tar is placed below, while the interstices between the blocks are filled with gravel or sand, and a coating of hot coal tar is poured over the surface. In many places the pavements are made of asphalt, but this material is not serviceable where the traffic is heavy. The asphalt is mixed with sand so as to form a coating two or three inches deep, which is spread over a solid foundation, and smoothness is obtained by running a heavy roller over the new work. This class of paving is noiseless and less injurious to driving vehicles than either brick or stone. Solid concrete paving, about six inches thick, is now built extensively on rural highways. Good asphalt paving is built by first molding trap rock and asphaltic cement under heavy pressure to form blocks and these are laid much like brick. It has the advantage of being more uniform in composition than ordinary asphalt pavements.

PAVIA (pä-vē'ä), a city in northern Italy, twenty miles south of Milan, on the Ticino River, near its confluence with the Po. It is the capital of the province of Pavia, has extensive railroad facilities, and is surrounded by a fertile agricultural and fruit-growing country. Pavia has a considerable trade and numerous municipal facilities, including electric lighting, waterworks, and stone pavements. Among the manufactures are porcelain, textiles, jewelry, wine, toys, musical instruments, and machinery. Its celebrated university was founded by Charlemagne in 774, and in the Middle Ages it ranked as a noted seat of learning. With it are affiliated a number of colleges, historical and anatomical museums, a school of fine arts, a botanical garden, and a library of 150,000 volumes. This institution has advanced courses of study and is attended by about 1,400 students. Other noted buildings include the cathedral founded in 1488; a splendid monastery built by the first duke of Milan, situated four miles north of the city; the Church of San Petro; and the Church of San Michele, regarded the oldest in Italy. The Gauls founded Pavia, but Attila captured it in 453, and it was taken by Odoacer in 476. It was made the capital of Lombardy in the prosperous times of the Lombards, when it ranked as the most important city of Italy. The French were defeated here in 1525, but two years later it was laid waste by them, and Napoleon pillaged it in 1796. In 1814 it became a part of Austria, but since 1859 it has belonged to Italy. Population, 1922, 36,744.

PAWNBROKER (pạn'brō-kẽr), a person who loans money on the security of personal effects, such as jewelry and clothing, which are left in possession of the lender. The business of a pawnbroker is usually limited to small loans and a large amount of the goods pledged or deposited are not redeemed within the time agreed upon, hence the business involves both lending money and selling the unredeemed goods. In some countries the law requires that the goods are to be advertised for sale and sold at auction, but this provision is either evaded directly, or the loan is stipulated so as to have the effect of a sale after the expiration of a definite time. Many pawn shops are maintained in the larger cities of Canada and the United States, and a majority are in the hands of Jews. Loans made by pawnbrokers usually bear a high rate of interest, or a specified sum of money is charged instead of specifying a definite rate.

PAWNEES (pạ-nēz'), a tribe of North American Indians who were first found in the basin of the Platte River, in Nebraska. They consisted of four different bands, known as the Grand Panis, the Tapage Panis, the Republican Panis, and the Lanks. Their hostility to the Sioux, Arapahoes, and Sacs and Foxes extended through a period of many years, but they were peculiarly friendly to the whites. A cession of their lands was made in 1833, when they were confined to a reservation on the north side of the Platte River, but in 1876 they retreated before the Sioux to southern Nebraska, and in the latter part of that year removed to Indian Territory, now Oklahoma. Their history includes an account of a number of brave chiefs. At present they are making rapid progress in educational and industrial arts. A vocabulary of their language has been published, but there is no extended grammar.

PAW-PAW. See **Papaw.**

PAWTUCKET (pạ-tŭk'ĕt), a city of Rhode Island, in Providence County, on the Pawtucket River, four miles north of Providence. It is at the head of steamboat navigation and on the New York, New Haven and Hartford Railroad. The river supplies an abundance of water power, having a fall of about fifty feet. It has the Collyer Monument, Daggett Park, and a soldiers' memorial monument. Among the principal buildings are the State armory, the Sayles Memorial Library, the public high school, the city hall, the Kinyon Block, the Taylor building, and the home for aged poor. Samuel Slater established the first cotton factory in Pawtucket in 1790. Cotton goods and cotton thread are the leading manufactures Other products include knit goods, braid, cement, textiles, dyed goods, plush, cordage, leather, ironware, machinery, packed meat, and boilers. It has a large trade in lumber, coal, cement, brick, and merchandise. The place was settled in about 1654 and incorporated in 1765

as North Providence. In 1886 it was incorporated as the city of Pawtucket. Population, 1900, 39,231; in 1925, 69,730.

PAXTON (păks't'n), **Sir Joseph,** architect and ornamental gardener, born in Bedfordshire, England, Aug. 3, 1803; died June 8, 1865. He studied in the grammar schools of Woburn, became a gardener to the Duke of Devonshire, and in 1851 designed the Crystal Palace constructed at the London International Exhibition. The successful construction of this structure caused him to be knighted. He was chosen a member of Parliament in 1854, in which capacity he continued to serve until his death. He published "The Cottage Calendar" and a "Pocket Botanical Dictionary." Paxton was editor for a time of the *Botanical Magazine* and of the *Horticultural Register.*

PAYER (pī'ĕr), **Julius von,** painter and explorer, born in Schönau, Bohemia, Sept. 1, 1842. He was educated at the Vienna Military Academy and in 1859 entered the Austrian army. In 1865 he was made professor of history at the Vienna Military Academy, subsequently surveyed some of the most inaccessible regions of the Alps, and in 1869 joined the second German exploring expedition sent to the Arctic Ocean, which enabled him to extend the general knowledge of the extent of the coast of Greenland. He joined Weyprecht in the Austrian expedition to the North Pole, in 1872, which resulted in the discovery and exploration of Franz-Josef Land. On returning to Europe, he studied painting in Frankfort, Munich, and Paris, and subsequently devoted himself entirely to that art. Among his productions are "Leaving the Ships," "Bay of Death," "Never Retreat," "Death of Franklin," and "Views of Franz-Josef Land." He published "The Austrian North Polar Expedition in 1872-74." He died Aug. 31, 1915.

PAYNE (pān), **John,** poet, born in London, England, Aug. 23, 1842. He studied law and practiced his profession for a brief period. Besides writing a large number of poems, he made many translations. As a poet he belongs to the Neo-romantic school, which includes Morris, Rossetti, Marzials, and Swinburne. Among his poems are "A Masque of Shadows," "Lautrec," "Intaglios," and "Songs of Life and Death." Among his translations are "Tales from the Arabic," "Arabian Nights," "Aladdin and the Enchanted Lamp," "Decameron of Boccaccio," and "Poems of Shemseddin Mohammed Hafiz of Shiraz."

PAYNE, John Howard, actor and dramatist, born in New York City, June 9, 1792; died in Tunis, April 10, 1852. He was employed in a New York countinghouse at an early age. While there he edited the *Thespian Mirror* and in 1807 entered Union College, where he attended two years. His first appearance as an actor was at the Park Theater, New York, in 1809, and in 1813 he played successfully at the Drury Lane Theater, London. His theatrical career extended over a period of about twenty years, as actor, manager, and playwright. Payne is the author of a number of operas and dramas. He was editor of the *Opera Glass,* a London dramatic paper, in 1826-27, and in 1832 returned to the United States. He was consul at Tunis, Africa, from 1841 to 1845 and was appointed to the same place a second time, in 1851, where he died the following year. The remains were removed from the Saint George (Tunis) cemetery to Washington in 1893, and in both the cities are monuments to his memory. His principal literary production is the song "Home, Sweet Home" by which his name has been made immortal. Other writings include "The Maid of Milan," "Charles the Second," and "Brutus." A singular incident in connection with the life of Payne is that he never had a permanent home after the age of thirteen.

JOHN HOWARD PAYNE.

PAYNE, Sereno Elisha, public man, born at Hamilton, N. Y., June 26, 1843; died Dec. 10, 1914. He studied at Rochester, was admitted to the bar, and established a successful law practice at Auburn. After holding several city offices, he was elected district attorney of Cayuga County, and in 1882 was chosen as a Republican member of Congress. Two years later he was reëlected and was again elected to Congress in 1888, serving continuously for nine terms. He exercised a wide influence in shaping the policy of his party, both in Congress and in the nation. He aided in framing the Dingley and the McKinley tariff laws and in promoting the Payne Tariff Bill, in 1909.

PAYSON, Edward, clergyman, born in Rindge, N. H., July 25, 1783; died in Portland, Me., Oct. 22, 1827. He was educated at Harvard University and, after studying theology, became a Congregational clergyman in Portland, where he ministered efficiently to a large society until his death. His ability as a pulpit orator and student brought him into prominence. He published several volumes of discourses and sermons.

PEA, the common name of a genus of plants of the natural order *Leguminosae.* It is assumed that peas are native to Western Asia, where several species grow wild, especially in the region of the Caspian Sea. They were cultivated as garden plants by the ancient Greeks and Romans, who obtained the improved varieties from the Egyptians. Their introduction into Western Europe came about through trad-

ers from Holland, whence they were distributed to all the continents. About fifty species are cultivated, all of which have been improved by propagation. Two distinct classes are recognized, known as the *common pea* and the *eatable-podded pea.* The latter is sometimes spoken of as sugar, skinless, and string pea, from the circumstance that its pod is sweet, tender, and succulent. In most climates it grows to a height of two to five feet. It bears long pods containing spherical seeds and flowers later than the common pea. This plant should be supported by trellis work in order to secure the best yield. The common pea is cultivated very abundantly, largely because of its early yield of seeds, which are valuable for cooking or canning while in an unripe condition. Its pods are rarely eaten, having a tough, parchmentlike lining. The *German dwarf pea* is a favorite species for early use. It grows to a height of about nine inches and, if sown early in the spring in a rich, warm soil, it yields abundantly. Other species include the *little gem, Tom Thumb, Kent,* and *May pea.* The *cow pea,* which is grown extensively in the Southern States, is a forage plant.

PEABODY (pē'bŏd-ĭ), a city of Massachusetts, in Essex County, fourteen miles north of Boston, on the Boston and Maine Railroad. It is a manufacturing and commercial center. Among the manufactures are glue, clothing, leather, textiles, earthenware, machinery, and utensils. The noteworthy features include the public library, the townhall, the Soldiers' Monument, the Lexington Monument, and many schools and churches. It is the seat of the Peabody Institute, an institution founded by George Peabody, who endowed it with $200,000. The city was incorporated as South Danvers in 1855, but in 1868 it adopted the present name in honor of the philanthropist, George Peabody, who was born here. Population, 1925, 19,870.

PEABODY, Andrew Preston, clergyman and author, born in Beverly, Mass., March 19, 1811; died in Boston, March 10, 1893. He completed a course at Harvard University by graduation in 1826, studied theology at Cambridge, and soon after became pastor of the South Parish Church in Portsmouth, N. H., where he labored until 1860. In that year he became pastor to Harvard University, and from 1861 to 1881 was professor of Christian morals in that institution. From 1852 to 1863 he edited the *North American Review* and was a contributor to various periodicals. After leaving Harvard, in 1881, he devoted his attention to literary work and lecturing. His writings include "Sermons of Consolation," "Manual of Moral Philosophy," "Lectures on Christian Doctrine," "Christianity the Religion of Nature," "Harvard Reminiscences," "Sermons for Children," "Christianity and Science," and "Harvard Graduates Whom I Have Known."

PEABODY, George, merchant and philanthropist, born in South Danvers (now Peabody), Mass., Feb. 18, 1795; died in London, England, Nov. 4, 1869. He descended from a New England family that had immigrated six generations before his birth, was educated at a district school, and at the age of eleven years he became clerk in a grocery store. After serving in the War of 1812, he formed a partnership with Elisha Riggs in a dry-goods store in Georgetown, D. C. In 1815 the business was removed to Baltimore. Branch stores were soon after founded in New York and Philadelphia, and in 1837 he established himself as merchant and money broker in London. He discontinued connections with the American business establishments in 1843 and devoted his energy to the development of his institution in England, where he came into possession of much wealth, which he used largely for philanthropic purposes.

In his lifetime Peabody gave away $5,500,000. These gifts include $1,000,000 to the Peabody Institute in Baltimore; $10,000 to the North Polar expedition under Dr. Kane; $25,000 each to Kenyon College, at Gambier, Ohio, and Phillips Academy, Andover; $50,000 for educational purposes in North Danvers; $200,000 to found the Peabody Institute in South Danvers; and $2,500,000 for constructing homes for poor people in London, which are capable of accommodating 20,000 persons. In 1867 he established the Peabody Educational Fund of $2,100,000 to be devoted to education in the Southern United States, but two years later increased it to $3,384,000. This fund was first used to encourage the establishment of the public school system, but, after schools were generally established, it was applied to train teachers in institutes and normal schools, for which purpose it is used at present. Congress voted him special thanks for his large gifts to public institutions in America, in 1867, and Queen Victoria offered him a baronetcy, but this he declined. However, the queen gave him a letter and her portrait, which is now on deposit in the Peabody Institute, at Peabody, Mass. His death occurred at Eaton Square, London, and the remains were taken to America and buried at Danvers, Mass. Statues have been erected to his honor in Baltimore and London. He left by will about $5,000,000 to relatives and friends.

PEABODY, Selim Hobart, educator, born at Rockingham, Vt., in 1829; died in 1903. He studied at the University of Vermont, where he graduated in 1852, and for some years held professorships of physics, engineering, and mathematics. In 1880 he was made president of the University of Illinois, where he served until 1891, and in 1899 became statistician of the commission to the Paris Exposition. He was president of the Chicago Academy of Sciences from 1892 to 1895 and was president of the National Educational Association in 1890.

PEABODY EDUCATIONAL FUND. See **Peabody, George.**

PEACE, a river of Canada, which rises in the Rocky Mountains, in British Columbia, by two branches. It flows in a tortuous course toward the east and merges into the Slave River, near Lake Athabasca, and enters the Great Slave Lake by five mouths as the Slave River. The delta of the Peace River is remarkably fertile and its valley is rich and beautiful. Rapids impede navigation in many places, but it is navigable for some distance by small steamers. The entire length is about 800 miles.

PEACE CONFERENCE. See **Hague, The.**

PEACH, a class of fruit trees, which are cultivated in all the countries having a warm or temperate climate. Some writers have classed the peach tree as a distinct genus, while others consider it allied to the almond, cherry, and plum. The size and shape differ largely according to the soil and climate, though it may be stated that its general height is from eight to twenty feet.

PEACH FLOWER.

Its branches are irregular, the leaves are glossy and lanceolate, and the rose-colored blossoms appear in early spring before the leaves are apparent. The fruit is fleshy, juicy, and highly flavored. It is a roundish drupe from one to three inches in diameter, has a downy reddish, yellowish, or whitish skin, and incloses a furrowed flattish stone. The peach tree is native to Persia and Syria, where several species grow wild. It was introduced into Western Europe at an early date, and is now grown for the market in abundance. The two principal classes are the *freestones* and the *clingstones,* so named on account of the stones being free from or attached to the fleshy part of the fruit. Each of these classes includes many species.

In the more severe climates of the Temperate zones the peach trees bear only from two to three years, but in those having an equable and favorable climate they yield fruit successively for nearly 100 years. This fruit is grown more extensively in North America than in any other continent. It is propagated from the seed and is cultivated in orchards like apples. The most productive peach-growing regions are on the southern shores of the Great Lakes, in the central part of the Mississippi valley, in the Southern States, and on the Pacific coast. New York, Ohio, Michigan, California, Texas, Georgia, Oklahoma, and Washington are among the larger producers of peaches. All the Southern States produce peaches, though the largest yield is in Georgia, where the annual production is about 5,750,000 bushels. The total yield of the United States averages about 40,500,000 bushels of marketable peaches. Ontario and British Columbia are well adapted to the culture of peaches. Those gathered for the markets are picked by hand before they are fully ripe and are shipped in refrigerator cars. Large quantities are canned and dried for the market, in which condition they can be kept indefinitely. A fine grade of peach preserve is made where large orchards abound.

PEACOCK, or **Peafowl,** a class of beautiful birds of the pheasant family, native to Southeastern Asia. In the wild state peacocks are met with mostly while perching in trees, but they make their nests on the ground, where the peahen lays from twenty to thirty eggs in the early spring and may later be seen in company with a large brood of young, usually from ten to twenty. The young are very difficult to rear in a cold climate, and the adult peacocks are quite unskilled in making rapid escape while on the ground. The males and females have a similar appearance until about two years old, when the tail coverts of the male begin to develop. They reach full development at three years, when the male has a most beautiful appearance. The *common peacock* is about the size of a hen turkey, and the wild birds are more brilliant than the domesticated. Both sexes are marked by various spots, but the tail coverts of the male are especially beautiful for their eyelike spots and are much used for purposes of decoration. The *Tibetan peacock* is somewhat smaller, but has fine plumage. A fully developed male peacock has blue and golden colors. Formerly they were eaten, but now peacocks are kept chiefly for ornament in house and barn yards. The ancients regarded the peacock as the attribute of Juno, and the Christians of Byzantium looked upon it as a symbol of the resurrection. At present it is typical of vainglory. See illustration on following page.

PEALE (pēl), **Charles Wilson,** painter and naturalist, born in Chestertown, Md., April 16, 1741; died in Philadelphia, Feb. 22, 1827. He first learned saddlery, but soon after studied art under a German teacher in Boston and under J. C. Copley. Subsequently he was instructed by Benjamin West in London, but returned to America to serve in the Revolution and commanded a company at Germantown and Trenton. His principal paintings include portraits of Washington, Steuben, Hancock, Hamilton, and Morris. He contributed a number of articles on science to periodicals and lectured on natural history. His writings include essays on "Domestic Happiness," "Building Wooden Bridges," and "A Discourse Introductory to a Course of Lectures on Natural History."

PEALE, Rembrandt, painter, son of Charles

Wilson Peale, born in Bucks County, Pennsylvania, Feb. 22, 1778; died in Philadelphia, Oct. 3, 1860. He received instruction from his father, painted portraits at Charleston, S. C., and subsequently studied under Benjamin West at London. He visited Paris and other cities in Europe. A portrait of Washington painted by him in 1823 was purchased by the government for $2,000. His portraits embrace those of Perry, Jefferson, Cuvier, and Decatur. Other paintings include "Jupiter and Io," "Napoleon on Horseback," "The Roman Daughter," and "The Court of Death." He wrote "Reminiscences of Art and Artists," "Notes on Italy," and "An Account of the Skeleton of the Mammals." He contributed to the *Crayon* and edited the "Portfolio of an Artist."

PEANUT, Ground-Nut, or **Ground-Pea,** a trailing plant of the bean family, bearing a hairy stem, small yellow flowers, and two-paired primate leaflets. The flowers are sterile above ground. After they wither, the forming stalk of the ovary bends downward and forces the young pod underground, and the seeds mature some distance below the surface. The pods have from one to three seeds. Peanuts are

1, COMMON PEACOCK. 2, TIBETAN PEACOCK.

cultivated extensively in many parts of the United States, especially in Virginia, the Carolinas, and other Southern States. They thrive best in a light, sandy soil, yielding from 35 to 100 bushels per acre. Many well-defined species have been obtained by cultivation, most of which

PEANUT—PLANT AND FRUIT.

are thought to be from plants that are native to Africa, where they are grown extensively. but other species are native to South America. They were cultivated on the Maranon River, in Brazil, as early as 1596. Where they are cultivated on a small scale, the laborers take them from the ground with hoes, but on the larger plantations the roots and nuts are plowed out with a peanut digger. After drying several days in cocks or sheds, they are cleaned carefully and in some cases are bleached. Large quantities are baked and eaten. They yield peanut oil, a product resembling olive oil, which is used extensively in manufacturing fine grades of soap. It is employed for salads and other purposes. The husks and shells of peanuts are useful in feeding stock. Some species may be grown as far north as central Illinois and Iowa, but they must be planted early, else the seeds do not mature.

PEAR, a fruit tree belonging to the same genus as the apple, cultivated extensively for its fruit. It is native to Asia and some parts of Europe, where it may be found growing wild, either in the form of a shrub or tree. The fruit in a wild state is small and the trees are thorny, but under cultivation the tree is thornless, grows to a height of from 25 to 60 feet, and in favorable climates attains a diameter of three feet. Writers recognize 225 species, of which 36 were cultivated in Rome at the time of Pliny.

(Opp. 2132)

Ayer Pear.

Augbert Peach.

Exterior and interior views—Notice the seeds.

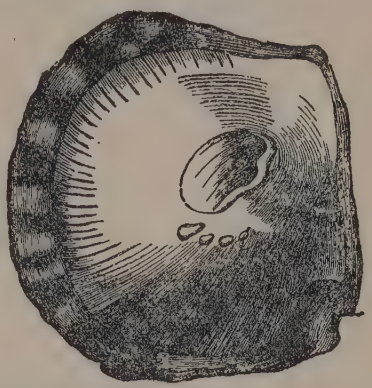
In some climates the trees bear only a few years, while in others they have been known to yield fruit for more than 300 years successively. The wood of old trees is hard and durable and is of value in manufacturing musical instruments and turners' tools and for making wood engravings. The fruit has a juicier pulp than the apple, is somewhat longer, and tapers toward the stem end.

The pear may be propagated by grafting on the quince, white thorn, and other trees, and is usually budded or grafted on seedlings of a species of pear called *free stocks*. A species known as the *Bartlett pear* is the favorite variety in the American market. It is luscious, yields abundantly, and is of large size. Next to it is the *Seckel pear*. The Bartlett constitutes fully ninety per cent. of all the pears grown in the United States. The cultivation of pears extends to practically every country within the tropical and temperate zones. California produces large quantities of excellent size and next to it the State of Washington takes rank. Other states producing extensively include Oregon, New York, Michigan, Indiana, and Pennsylvania. The pear crop of the United States aggregates about 17,500,000 bushels annually. Canada is a prolific producer of several fine grades of pears. The largest yield is in Nova Scotia, New Brunswick, Ontario, and British Columbia. Pears are picked before quite ripe, wrapped in separate papérs, and transported in refrigerator cars. Large quantities are eaten fresh or canned for table use. In some regions pears are dried similarly to apples and peaches. They are used in the manufacture of wine and a pear cider known generally as *perry*. Pear cider is made in large quantities in France and other countries of Western Europe.

PEAR FLOWER.

PEA RIDGE, Battle of, an engagement of the Civil War in America, fought at Pea Ridge, Ark., on March 7 and 8, 1862. Gen. S. R. Curtis had an army of 10,500 Federals and advanced against Springfield, Mo., which was held by the Confederates under General Price. However, the Confederates withdrew and made an attack upon the Federals from the rear, the battle taking place at Pea Ridge, in the northwestern part of Arkansas. They had about 14,000 men and were commanded by General Van Dorn, who retreated under cover of his artillery, having lost about 950 in killed and wounded. The Federals sustained a much heavier loss, a total of 1,384, but Missouri was saved to the Union cause.

PEARL, a calcareous secretion formed chiefly of calcium carbonate, found as a morbid deposit around a central nucleus within the shells of various mollusks, especially those of pearl



INSIDE VIEW OF PEARL-OYSTER SHELL.

oysters and river mussels. Pearl oysters occur in beds similar to those of the common oyster. Their shell is rough and greenish on the outside, and on the inside is a coating composed of nacre, or mother-of-pearl. Pearls of the same material as mother-of-pearl occur both in the flesh of the oyster and as attached particles on the outside, often from ten to twenty different pearls being found in one oyster. It is thought that the pearl originates from some foreign substance like sand getting into the shell or oyster, around which the hard, pearly growth forms. The Chinese have developed a system of cultivating pearls by placing small beads and other hard substances in living pearl oysters and replacing them in the sea, where they remain until pearls are sufficiently developed, when they are caught and the developed product is secured.

The most valuable pearl fisheries are those of Ceylon and the Persian Gulf, where the industry has been carried on from remote antiquity. Pearl fisheries of much value exist in the Gulf of Manar, on the northeastern coast of Ceylon, where the shells of mollusks measure from nine to twelve inches in diameter, though in the pearl fisheries of California and the Gulf of California the shells are somewhat thicker. Pearl fishing on the Asiatic coast continues only about a month each year, usually beginning in March. Divers descend to a depth of from sixty to eighty feet, where they loosen the oysters and are pulled up in from 40 to 60 minutes, though in rare cases they are able to remain under water 75 minutes. The diver is aided in sinking by a weight of about thirty pounds being attached to his feet and, when he has gathered a number of oysters into a net, he is pulled up by means of a rope. Boats

receive the oysters at the surface and carry them to the shore, where they are piled in the sun and allowed to decompose. When sufficiently rotted, they are carefully washed and examined for pearls, and those attached within the shell are removed by means of a hammer. Pearl oysters occur over extensive areas of the Pacific Ocean, including the coasts of Borneo, the Sulu Islands, Australia, and the Bay of Panama. Pearls are also secured in the Gulf of Mexico, and in many of the rivers of the United States, Canada, Russia, Germany, Great Britain, and other European countries.

Pearls are more or less dependent on their size, form, and structure for commercial value. They are separated into several classes. The smaller are called *seed pearls* and are sold in the market by weight, while the larger ones are sold with reference to their composition and color. Those of a rose tint are counted the most valuable in some countries, though others prefer the yellow. Pink pearls are valuable on account of their rarity, but the highest price is paid for black pearls, which are the most rare and are found only in several kinds of shells. The principal uses of pearls include decoration, ornament, and trimming for inlaid work. *Mother-of-pearl* is used in making the handles of knives and forks and for buttons. Within recent years considerable progress has been made in the manufacture of artificial pearls, particularly in Italy, Germany, and France. The imitations consist of blowing very thin beads of glass and finishing them with the scales of certain fishes, as the dace and bleak. Julius Caesar possessed a large number of pearls, many of which he brought from the streams of Great Britain. In one instance he is said to have paid $240,000 for a fine specimen. It is reputed that Cleopatra dissolved a pearl valued at $350,000 in vinegar and drank it, while another was cut under her direction into earrings for the statue of Venus in Rome. The most valuable pearl now in existence is owned by the Shah of Persia.

PEARL RIVER, a river having its source in Neshoba County, Mississippi, about 100 miles northeast of Jackson. After a course of about 350 miles, it flows into the Gulf of Mexico. It has a winding course toward the south, is navigable as far as Jackson, and the lower valley is subject to overflow. The Bogue Chitto River, which joins it in Louisiana, is its largest tributary.

PEARY (pē'rĭ), **Robert Edwin,** Arctic explorer, born at Cresson, Pa., May 6, 1856; died Feb. 20, 1920. He removed to Maine, where he attended school, and afterward graduated at Bowdoin College. In 1885 he became a civil engineer in the United States navy, and made expeditions toward the North Pole in 1886, in 1891, and in 1893. From the last mentioned expedition he returned Sept. 21, 1895, to Saint Johns, Newfoundland, in the steamer *Kite,* which had sailed for the relief of his company. He made a successful expedition to Greenland in 1896. In 1902 he reached 84° 17′, northwest of Cape Hecla, and four years later attained 87° 6′ north latitude. He discovered the North Pole in 1909. He published several reports of his travels, including "Northwest over the Great Ice Sea." See **Polar Expeditions.**

ROBERT E. PEARY.

PEASANTS' WAR (pĕz'ants), an insurrectionary movement in Germany, which was instituted by the peasants for the purpose of securing relief from the extravagant taxes and the oppression of the nobles. The movement was organized in the south of Germany, in 1476, and by 1525 it had spread over all that country. Some of the nobles regarded the movement with favor, since it was at least partially directed against the clergy, a part of which had become both oppressive and sensual. In several instances the peasants secured success. They were supported by the towns of Frankfurt, Mühlhausen, Fulda, and others, but the lack of systematic coöperation made it impossible for the enterprise ultimately to succeed. Among the principal demands were the abolition of serfdom, the free election of their parish clergy, the support of the poor, the equality in the administration of justice, the abolition of clerical exactions, and the restoration of titles to certain forests and land. The peasants were defeated with vast losses in South Germany in the early part of 1525, and Philip of Hesse defeated them in several engagements in the North. The movement was unfortunate for the peasants in that they were reckless in the destruction of castles, convents, and churches, which they pillaged, and they also committed other excesses. After they were finally quashed, their burdens became even greater than before and many of their leaders were executed. In this conflict for human rights fully 150,000 persons suffered death.

PEAT (pēt), a substance resulting from the decomposition of various plants in the presence of moisture, found chiefly in bogs and marshes. It is confined principally to the colder countries, since decomposition takes place too rapidly in the warmer climates to form peat. At the surface it contains considerable water and becomes gradually more compressed toward greater depths until it approaches the condition of lignite. In the high latitudes it is formed of various species of bog moss. These forms of vegetation produce peat below, while at the surface

new shoots grow up to take the place of the decaying parts. Recently formed peat has a brownish hue and a soft consistency, while the older is quite dark in color. Extensive peat bogs often have a depth of fifty feet, and when the product is taken from the deposits it contains about eighty per cent. of water.

The peat is cut by implements in rectangular forms and is placed on an elevated surface to dry. When sufficiently dry it is used for fuel, giving out a constant heat with little smoke. Peat of ordinary consistency contains 56 per cent. of carbon, six per cent. of hydrogen, and 38 per cent. of oxygen and nitrogen. It occurs extensively in Northern Europe, particularly in Russia, Great Britain, and Germany. Extensive beds are found in New England, Canada, and other high latitudes, where it is used for fuel. Within late years various machines have been invented to compress peat artifically to free it from water, though formerly moisture was removed exclusively by a slow drying process. Peat can be burned in furnaces, ranges, stoves, and open grates. It is employed both for heating and cooking. Dense peat gives the best results when burned upon a grate, and the fibrous kind is best for use in stoves and open fireplaces without a grate.

PEBBLE, a fragment of rock ranging in size between a grain and a cobble, having a rounded form due to the action of water, ice, or wind. Pebbles are found in abundance among the deposits of all geological periods, but in most cases they are held together by lime, silica, or iron, thus forming large stones. Pebbles formed of rock crystal and agate occur in many places. In this form they possess value in the manufacture of optical supplies and jewelry.

PECAN (pē-kăn'), a species of hickory common to North America. It is noted for its fruit, which is the most palatable of all the hickory nuts. The tree attains a height of sixty to seventy feet, has a straight trunk, and bears leaves with thirteen to fifteen leaflets. The wood is of little use aside from fuel, but the nut is raised extensively for the market. It thrives in Arkansas, Mississippi, Illinois, Louisiana, and Texas. Large quantities of the nuts are exported to the markets of Europe.

PECCARY (pĕk'kà-rỹ), a genus of animals allied to the swine, found extensively in South America and the southern parts of North America. Two species have been described, the *white-lipped* and the *collared* peccary. The former is confined principally to the region between Mexico and Paraguay, where large droves are often met with, while the latter ranges from Patagonia to Arkansas in small packs. The white-lipped peccary has been successfully domesticated. It never produces more than two young at a birth. It has tender, agreeable flesh, which is less fat than that of swine. The peccary feeds on potatoes, maize, sugar cane, and other vegetable forms. Both species have curved tusks and a dorsal organ secreting an oily, musky substance. The latter must be removed immediately after the animal is slaughtered, since it otherwise conveys a peculiar scent to the flesh.

PECK, Harry Thurston, philologist, born in Stanford, Conn., Nov. 24, 1856. He graduated at Columbia University, in 1881, and was made instructor in Latin at the same institution. Subsequently he studied in Paris, Rome, and Berlin, and in 1888 was made professor of Latin language and literature at Columbia University. He was lecturer in classical philology at Barnard College for Women for some time, secretary of the faculty of Columbia University, and an incorporator of the Columbia University Press. Among his published works are "Classical Studies," "Semitic Theory of Creation," "Latin Pronunciation," "Roman Life in Latin Prose and Verse," and "Dictionary of Classical Literature and Antiquities." He was for some years the editor of *The Bookman,* which position he accepted in 1895. He died Mar. 23, 1914.

PECKHAM (pĕk'ạm), **Rufus William,** jurist, born at Albany, N. Y., Nov. 8, 1838. He studied at the Albany Academy and in Philadelphia and was admitted to the bar in 1859. The following year he succeeded his father, Rufus Peckham, as law partner to Lyman Tremain. In 1868 he was elected district attorney of Albany County, serving three years, after which he was chosen a judge of the supreme court of New York. He attended several Democratic national conventions, including those of 1876 and 1880. President Cleveland appointed him associate justice of the United States Supreme Court in 1895. He died Oct. 24, 1909.

PECOS (pā'kōs), a river of the United States, which rises a short distance east of Santa Fé, N. M., and, after a course of about 800 miles toward the southeast, joins the Rio Grande at Painted Cave, Tex. It has a number of tributaries both in New Mexico and Texas, but in the summer season little water flows in its channel.

PEDAGOGY (pĕd'ȧ-gō-jỹ), or **Pedagogics,** the science and art of teaching. A wider definition would be the science and art of education and this would probably be also a truer definition of the wŏrd as now used. Some American educators have objected to the term pedogogy, but there seems to be no just ground for this objection and any dislike of the word is certainly not shared by either German or French writers upon the subject. The term may not be wholly satisfactory in the etymological sense, but by our widespread usage it has come to connote quite clearly the processes of formal education.

The subject includes educational psychology, methodology, and educational economy. The first underlies the whole subject, as there can be no good teaching and no successful school management that are not based upon psychology.

EDUCATIONAL PSYCHOLOGY. Educational psychology is both theoretical and practical, or applied. As theoretical, it is constantly pushing forward into the realm of observation and experiment, seeking to establish definitely the conditions and modes of mental growth. In its applied phase, it claims to have formulated certain fundamental laws of mind activity that shall furnish trustworthy guidance to the teacher who is actually at work. It should be remembered that there is much psychology of a most interesting character which is purely speculative, or is concerned with problems of consciousness that lie outside the field of teaching. In these phases of psychology the teacher has little or no professional interest. They do not touch in any helpful or intimate way his daily work. It is here that the chief criticism lodges against much psychology that is offered in teachers' reading circles; it is of no special benefit to the teacher as a teacher, no matter how interesting it may be to the investigator or the general reader.

A subdivision of psychology which should receive special attention from the teacher is genetic psychology, which undertakes to show something of the beginnings of the activity of the different powers of consciousness. The constantly developing subject of child study is the leading phase of genetic psychology. The important questions here are: What activities manifest themselves first? In what order are they manifested? And at what ages of the child do they become most characteristic? It is now generally recognized that the most important periods of the child's life are in the first two or three years of school and in adolescence. Genetic psychology, in the strict meaning of the words, deals with the earlier years of the child's mental life, and the psychology of adolescence is usually treated as a separate subject; although, if the term *genetic* be used in its widest sense, it could be applied to the beginnings of any phase of development of mental activity. It is hardly necessary to say that although the psychology of childhood should receive the special attention of the elementary teacher and the psychology of adolescence should receive the special study of the secondary teacher, yet it is helpful to both to study both subjects. The elementary teacher should constantly look forward to the adolescent period and the secondary teacher should know how the child develops into the adolescent.

The teacher of any grade should study with care not only the best writing he can find upon psychological subjects, but should especially study the mental growth of the pupil himself with particular reference to the function of the sensory apparatus and the processes of concept, formation of judgment, imagination, the feelings, and the will. The mental life and growth of the pupil are wholly dependent upon the activity of these powers. The richness of an individual's mental equipment is dependent upon the number and clearness of his concepts. His adjustment to his surroundings and his adjustment of his surroundings to his own needs are dependent upon the quickness and accuracy of his judgment, the force of his imagination, the fullness of his emotional nature, and the strength of his will. The teacher should, therefore, know how to secure in his pupil the acquisition of abundant concepts, the exercise of the relational power which we call judgment, of the creative power or imagination, and of the great character builders, which are the feelings and the will.

The points of closest contact between psychology and the work of the teacher are in the psychological valuation of studies and in the mental operations of acquisition, assimilation, and expression. Only such subjects should find a place in the school curriculum as show rich values in practical utility, in mental discipline, or in culture. The determination of which subjects have greatest utility lies in the field of *educational economy*. The determination of the disciplinary and cultural value lies in the field of *psychology*. Some subjects are particularly valuable in developing the acquisitive powers—the senses and memory. It is true that every subject has some value in each of these three phases, but the subjects that are distinctly acquisitional are nature study and the elementary sciences, history, geography, physiology, and spelling. The subjects that are especially fitted to cultivate the assimilative powers are arithmetic, grammar, advanced history, and the sciences. Subjects that are particularly rich in culture value are those which are homocentric, such as geography, history, civil government, and sociology. It will be readily seen that most subjects have all three values to some extent. How much they have and how best to give the pupil the benefit of it can be determined only by a careful study of applied psychology.

A safe ground for the teacher to stand upon in his daily work is that furnished by the psychological fact of sensori-motor activity. All human knowledge comes from sense activity either directly or indirectly. The sensory stream is the ingoing stream and brings to the growing consciousness sense impressions of the external world. In the normal child, however, sensory impression tends to start a motor current which will have its effect in some form of expression. It has been too long the case that our schools pay but little attention to the material of either stream. There has not until comparatively recent years been any definite intelligently directed effort to supply valuable sense stimuli to the growing consciousness. With a world of sense objects all around him to which he must adjust himself and in which he must work all his life, the child has had little specific sense training. Book work has been the principal thing and has been sadly overdone. It is good to note a

change for the better in the introduction of nature study and elementary sciences in the grades. Since the ingoing stream is the sensory stream, it should be enriched in every way possible by the use of concrete objects in the student's environment. Every sense organ should be trained to a delicate sensitiveness to impression and the growing consciousness should be surrounded by carefully selected sense stimuli.

The truth, that the ingoing stream is a sensory current, has its correlative in the equally important truth that the outgoing stream is the motor stream, and that the motor impulses follow closely upon the sensory impulse is getting to be more and more recognized. This means simply that the present-day tendency to make manual training, vocational activities and even play integral and important parts of the curriculum is based upon the soundest psychology and is a clear if somewhat tardy recognition of the other arc of the sensori-motor circuit. The fully equipped school will provide abundant facilities for sense training and for motor training in all grades. It seems strange that so fundamental an application of an evident psychological truth should have been so slow in coming.

In the training of expression, or, as it has been well termed, *self-externalization,* it is well to remember that there are several equally important forms of externalizing the results of imagination, thought, and feeling. Of these, language, which has heretofore received the most attention, is only one, and not necessarily the most valuable. Other forms are drawing, music, constructive work in the making of things, and conduct. It is necessary to train pupils in all these forms of expression in order to produce the fully rounded human which modern ideals demand as the practical product of educational processes.

It is in expression that the usefulness of the teacher's knowledge of psychology and the value of his work in the schoolroom find their unerring test. The teacher cannot tell how much a pupil has acquired, how well classified his acquisitions are, or how accurately active his mental processes have been, except through the pupil's power to express results. Books that will be found helpful to the teacher in the study of educational psychology are: Halleck's "Education of the Central Nervous System," Roark's "Psychology in Education," Baldwin's "Psychology Applied to Teaching," Baldwin's "Elementary Psychology and Education," and Compayre's "Psychology Applied to Education."

Methodology. Methodology, or the science and art of method in teaching, grows immediately out of educational psychology and must rest upon it. This division of pedagogy is made up of the principles of sound and rational practice in teaching which have been drawn from a careful study of the learning mind. It is essentially an inductive science. The validity of its principles is wholly dependent upon conclusions that have been drawn from an extended observation of the actual movements of the mind in its processes of growth.

The chief problem which the student of method has to solve is: How has the learning child advanced so far in the short time between infancy and his entrance into school? The most important foundations of method which rest immediately upon known psychological facts and upon which in turn must rest all valid principles of methodology are: First, the child is innately active in mind and body and enjoys this natural and inherent activity; second, the mind has an inherent tendency to form general conclusions, that is, to generalize the facts of sensory perception, concepts, and all forms of expression; and, third, all the mental and physical life of the child tends constantly to find expression. A teacher who is in full possession of these fundamentals and some of their more evident applications is in a position to develop his own methodology which, after all, will be better than any other that he can get.

The two concepts which have been found most fertile in modern methodology are: First, that the child is the best guide to the teacher; that the teacher must study the child's method of acquisition, assimilation, and expression of knowledge rather than try to graft upon him an abstract, logical, and artificial method of the teacher's own. Second, that, if the child's interest be enlisted, all work becomes a pleasure to both pupil and teacher.

Pedagogy was not free to do any work worth while until it freed itself from the medieval conception that the child starts out innately wrong and needs restraint or alteration of its inherent tendency at every point. We know now that the only safe road in pedagogy is that indicated by the words of the Book, "A little child shall lead them." It may be truthfully said that the greatest discovery of modern pedagogy is the discovery of the child as a living organism that develops according to its own inherent laws and whose normal growth is in right directions. Just as the laws of biology were discovered by observing the behavior of living organisms, so the laws of pedagogy are discovered by observing the modes of activity of the psychic organism. Since taking the child as the only safe guide, pedagogy has traveled rapidly along the right road.

Another most favorable concept lying at the basis of good method is that embodied in the Herbartian doctrine of interest. It was, perhaps, unavoidable that so stimulating a principle should sometimes run into extremes. Two things should be carefully remembered by the teacher as safeguards against absurd applications of the doctrine of interest. One is, that interest is neither more nor less than some form of feeling; whatever arouses, stimulates or gratifies

feeling creates interest. The other fact to be remembered is that the teacher should be more concerned with remote interests than with immediate ones. The function of the teacher is not to follow blindly the transient and evanescent interests of the pupil, but to arouse in him an abiding interest in the work he ought to do to reach a definite end. This interpretation of the doctrine of interest cannot fail to carry pupils and teachers through almost any kind and amount of drudgery. A boy will do a great deal of work readily and willingly even when he feels a pronounced aversion to it, if he knows that by doing it he can attain to something that he especially desires. The same fact is the governing fact with all classes of workers, and is as true of the old as of the young.

It remains to mention a few of the most familiar and helpful general rules of method. One of these—to proceed from the known to the unknown—means that the introduction of a new subject should be connected with knowledge which the learner already possesses. If the new matter is altogether strange, there is nothing for the mind to take hold of in the attempt to master it. Another good rule is, proceed psychologically rather than logically in the presentation and development of a subject. For example, the logical presentation of a study of the human body would begin with cells and cell structure and pass to tissues, organs, and systems. The psychological presentation, which is the proper one and which conforms to the analytico-synthetic method, would begin with systems and pass to the organs, tissues, and cells. A third rule of methodology that should be generally observed is to train the learner in the ready formation of general notions derived from individual percepts and concepts. All fruitful mental activity depends upon the richness and accuracy of concepts, and, therefore, the formation of such concepts by the pupil should receive the constant thought and attention of the teacher.

The whole subject of methodology may be divided into general method and special method. *General method* is made up of the fundamental principles to which allusion has already been made, and *special method* is concerned with the application of these general principles to the work of the several branches of study. The following books have been found very helpful to the student of methodology: McMurry's "Method of Recitation," McMurry's "General Method," Roark's "Method in Education," Brooks' "Normal Methods," and McMurry's books of special method in the separate branches.

Educational Economy. This division of pedagogics includes the principles of practice, school organization, and management. It is now generally recognized that educational economy is as important and wide-reaching a study as political or social economy. In fact, educational economy is a necessary and integral part of social economy. Much of the best thought of the most careful students of sociology is given now to the topics just named. Valuable articles upon these subjects may be found, not only in the educational publications of the day, but in the best of the literary periodicals and papers. The American people are becoming fully awakened to the fact that they have a much more intimate and abiding interest in their school system and in the individual school which they are called upon locally to support than they have in who shall go to the State or Federal capitals to represent them in the state or national legislatures.

Educational economy naturally falls into three subheads: First, organization and administration of the individual school; second, organization and administration of school systems; and, third, correlation of the school and the community. The discussion of the organization and management of the individual school corresponds closely to the old title of school management, but includes not only the management of the rural school but the management also of the city school, the academy, the college, and the normal school, the fundamental principles being the same for all of these. The organization and administration of school systems include the making of a State, or Provincial, system and of a city system, and the careful planning and administration of the curricula for each.

In the second division of educational economy are discussed such topics as the culture epoch theory, the election of studies, the distinctive function of the elementary school and the secondary school, and the respective values of a vocational and a cultural curriculum.

For a time, considerable significance was attached in school circles to what is known as the *culture epoch theory,* which teaches that, as the child develops, he recapitulates or repeats the culture epochs in the development of the race from savagery and barbarism up to modern civilization. Attempts have been made to base practical school curricula upon this theory and provide study and employment for children suited to the different stages of their development, but the effort has been abandoned practically everywhere in America, as it now seems certain that many of the earlier experiences of the race should not be repeated by the child of to-day. It has been found also that the *culture epochs* in individual cases are so overlaid by race, local, and individual idiosyncrasies as not to be worth considering, other than in a very general way, in the arrangement of a school curriculum.

Many of the strongest American educators have advocated the doctrine of election of studies which promises to pupils the greatest freedom and choice of studies which they will pursue. This doctrine also, like many others in modern pedagogy, has been carried to an absurd extreme. Some schoolmen go so far as to advocate freedom of election in the grades. The

same view to which most educators are now coming is that the schools should offer and should require every pupil to take that definite body of knowledge which the experience of the race has found to be worth while, but that to this may be added such other subjects as the pupil shows special aptitude for.

Coming to a consideration of the relative functions of different schools, it appears that there is practically no difference of opinion as to the function of the elementary school. All are agreed that it is the agency for putting the child in possession of the alphabet to knowledge. With regard to the function of the secondary school there has been much difference of opinion and discussion. At present the tendency among schoolmen seems to be to advocate the establishment of one or all of the leading classes of high schools according to local conditions and the size of the community. Thus in one community there will be a classical high school; in another the English-scientific; in another, the commercial; in another, the manual training or vocation school; and in the larger centers all of these will frequently be found, their existence based upon the fact that the secondary school should concern itself with the preparation of the youth of both sexes for such things as a majority of them in any community will want to do after completing the high school course. If the community is one that has always sent a large number to college or university, the secondary school should fit for college. If the community is one in which the utilitarian view prevails, the high school should prepare for active life rather than for entrance to college.

With these questions is, of course, bound up intimately the question as to whether the modern secondary school and college should offer a vocational or a cultural curriculum. This question is still under active discussion and a conclusive answer will probably not be arrived at for some years to come. It is to be hoped that it will be so answered that every boy and girl will have, upon completing the work of the high school, a means whereby he may make an honest and satisfactory living and have his higher nature so trained at the same time that he can get rich enjoyment from the humanities.

The correlation of school and community, which is the third division of educational economy, includes such topics as the mutual relation of the home and school, the coöperation of public libraries, museums, and art galleries with the school, the establishment of night schools, and the use of schoolhouses as community centers every day or night as means of culture and growth for citizens of all ages, the establishment of public playgrounds, vacation schools, and educational extension designed to reach all classes. It will be seen from this summary that educational economy has a very wide reach and includes all topics which take the school on the one hand and the community on the other.

There has been in recent years a great increase in the interest of the general public in educational affairs. For a long time there was too much feeling that the work of the schoolroom, beyond mere rudiments of learning, has no vital connection with the practical affairs of life. The great educational awakening of the past decade or two has brought about many important and valuable changes in method and in management. The work of the classroom has been made more agreeable to the learner and thus more productive of mental growth and development. The course of study has been greatly enriched as the result of a realization of the relation of the individual to society and of the duty of society to the individual. The rapid changes brought about as the result of a closer study of educational processes and conditions have sometimes run into fads, but on the whole the tendency in educational matters has been constantly upward in the direction of better things.

The student of educational economy will find most valuable matter in the reports of the National Commissioner of Education, the reports of the National Educational Association, and in the reports of the city and State or Provincial superintendents.

PEDEE, Great and Little. See **Great Pedee.**

PEDOMETER (pē-dŏm′ē-tēr), or **Odometer,** an instrument in the form of a watch, which is used to measure distances passed over in traveling. A small pedometer, containing a train of wheels in a small case and registering on a dial the number of impulses from a cord attached to the foot, is worn by persons walking. In this form it measures the number of paces traveled. An instrument of similar construction is attached to the wheel of a carriage or bicycle to indicate distance. The Romans attached pedometers to the wheels of carriages and chariots.

PEDRO I. (pē′drō), Emperor of Brazil, born in Lisbon, Portugal, Oct. 12, 1798; died there Sept. 24, 1834. He was the second son of John VI. of Portugal, became Prince of Beja in 1801, and, when his father ascended the throne of Portugal and Brazil, in 1816, he was titled Prince of Brazil. In 1807 the royal family fled to Brazil, where he secured his education, and in 1821 became regent of Brazil. The Brazilian people demanded a liberal constitution and threatened to depose Dom Pedro, but the latter sided with them for a more liberal government and was accordingly elected governor in 1822. At the death of his father, in 1826, he was made King of Portugal, which dignity he held only a short time before resigning in favor of his daughter, Maria II. A revolution in 1831 compelled him to resign in favor of Dom Pedro II., then only about six years old, and shortly after he sailed to Portugal, where he assisted in protecting the interests of his daughter. He was excommuni-

cated by the Pope, in 1833, for confiscating monastic property in Portugal.

PEDRO II., Emperor of Brazil, son of Pedro I., born in Rio de Janeiro, Brazil, Dec. 2, 1825; died in Paris, France, Dec. 5, 1891. His father abdicated in his favor on April 7, 1831, when he was proclaimed emperor. The government was first administered by a regency council and later by one regent. However, the chambers proclaimed him of age on Jan. 23, 1840, when he assumed sovereign power. He married Princess Theresa, sister of Francis I. of Naples, in 1843. He formed an alliance with Argentina and Uruguay against Paraguay in 1865 and a state of war continued until March 1, 1870, when the forces of Paraguay under President Lopez were annihilated and the latter died. In 1871 he made an extended tour of Europe, visiting the leading cities, and in 1876 visited many sections of the United States. An imperial decree issued in 1871 provided for the ultimate abolition of slavery, and he was likewise advanced in educational and industrial reforms, giving encouragement to the establishment of schools, railroads, and commercial development. A revolution on Nov. 15, 1889, terminated the empire and instituted the republic, when Dom Pedro left the country.

PEDRO THE CRUEL, King of Castile and Leon, born in Burgos, Spain, Aug. 30, 1334; slain March 14, 1369. He was the son of Alfonso XI., who was killed at Gibraltar on March 30, 1350, when the son succeeded him. He was married to Blanche de Bourbon, sister of the King of France, in 1353, but soon after divorced her for Doña Maria Padilla, who had previously been his mistress. His reign was one of great cruelty. He caused the death of his principal opponents and two of his brothers, which at length caused the people to raise a rebellion and depose him for his half-brother, Henry of Trastamare. The latter was defeated by an army under Pedro and retired to France, but in 1366 he returned with a large army to take possession of the throne. Pedro in the meantime had secured the assistance of Edward, the Black Prince of England, and on April 13, 1367, defeated Henry at Najera. Great cruelties were inflicted upon those surviving and the English allies withdrew. Henry, in the meantime, obtained material assistance from the French and again invaded the country. His entrance was generally hailed with delight by the people and on March 14, 1369, a battle ensued at Montiel, in which Pedro was defeated and made prisoner. Immediately after the battle a combat ensued between the two leaders, which resulted in the death of Pedro. Henry succeeded him with the title of Henry II.

PEEKSKILL (pēks'kĭl), a village of New York, in Westchester County, on the Hudson River, 43 miles north of New York City. It is on the New York Central Railroad and has communication by several bus lines. The chief buildings include the Field Library, the high school, the House of the Good Shepherd, and the Saint Joseph's Home. Among the manufactures are flour, machinery, ironware, stoves, cigars, electrical appliances, and clothing. It has systems of waterworks and sanitary sewerage. The place was settled in 1764 and incorporated as a village in 1816. Population, 1905, 13,200; in 1920, 15,868.

PEEL, Sir Robert, statesman, born near Bury, Lancashire, England, Feb. 5, 1788; died July 2, 1850. He was the son of Sir Robert Peel, a cotton spinner and baronet, graduated at Oxford in 1808, and the following year entered Parliament as a Tory. Peel was an influential member of Parliament for more than forty years, where he became distinguished for his prudence and ability. He was made Undersecretary of State for the Colonies in 1810, served as Secretary for Ireland from 1812 to 1818, and in 1822 became Home Secretary under the Liverpool ministry. Up to that time Roman Catholics had been barred from many government positions, but when he entered the Wellington Cabinet, in 1829, he favored the Catholic emancipation act, a bill to establish general equality. This course caused him to lose the friendship of the Tories, and in 1830 the ministry under Earl Grey succeeded that of Wellington. This ministry was committed to parliamentary reform, a policy Peel vigorously opposed, but the reform bill passed in 1832. He was reëlected in the latter year for Tanworth, which he represented in Parliament until his death.

Peel was selected as Prime Minister in 1834, but his party was in the minority, and the following year he gave up the place to Melbourne. In 1841 his party secured a large majority in the general election, when he again became Prime Minister, and soon after the banking act was passed. A famine in Ireland brought the repeal of the Corn Laws forward as a prominent issue in 1845, and the strong demand for cheap corn caused him to favor that act. He retired from an official position in the Parliament in 1846 and afterward acted with the Whigs, who were the advocates of free trade. Queen Victoria offered him the peerage, but this he declined, and also the Order of the Garter. His death resulted from an accidental fall from his horse in Hyde Park.

PEER, the general name applied to any one of the five degrees of nobility in England, consisting of the ranks of duke, marquis, earl, viscount, and baron. In a more strict sense it denotes a member of the House of Lords, who may be a nobleman or a prelate of the Church of England. The term, as used in a general sense, signifies equality, having reference to one of the same rank and station. This is the sense in which it is used by the English common law, which provides that the trial of a person is to be by his peers.

PEGASUS (pĕg'ă-sŭs), in Greek legend, a

beautiful winged horse that sprang from the body of Medusa when she was slain by the hero Perseus. It is stated that he immediately flew to the top of Mount Olympus, where he was employed by Zeus to convey thunder and lightning through the heavens, and later he carried Bellerophon in his fight against Chimaera. In later times Pegasus served the Muses and represented the poetical inspiration that tends to develop man's higher nature and causes the mind to soar heavenward. He was regarded the author of the sacred fount Hippocrene, which he produced by stamping with his heel near the summit of Mount Helicon, whence the Muses obtained their richest draughts of inspiration. Some writers assert that he was bridled by Bellerophon with a golden bridle received from Minerva.

PEI-HO (pā'hō'), a river in the northern part of China, which rises near the Great Wall and flows in a southeasterly direction through the province of Chi-li. It discharges into the gulf of Pe-chi-li at Taku, after a course of 350 miles. The Hun-ho joins it at Tien-tsin, where it is connected with the Grand Canal. Coast and river steamers navigate it to this point, a distance of eighty miles from its mouth.

PEIPUS (pī'pōōs), a lake in the northwestern part of Russia, about thirty miles south of the Gulf of Finland. It is fifty miles long and twenty miles wide. A narrow channel connects it with Lake Pskov, located a short distance south. The Narova River carries the overflow into the Gulf of Finland.

PEIXOTO (på-shō'tō), **Floriano,** statesman, born in Alagoas, Brazil, in 1842; died June 29, 1895. He secured a military education at Copacabana. Shortly after he entered the army of Brazil and served through the war with Paraguay from 1865 to 1870. At the Battle of Aquidaban, March 1, 1870, he was severely wounded and shortly after resigned to superintend his estate, but after his slaves were liberated he again entered military service. In 1890 he became a minister of war in the republic. The following year he was elected vice president of Brazil, and, when President Fonseca resigned, on Nov. 23, 1890, he became president. His administration was efficient. He was succeeded by Prudente de Moraes.

PEKIN (pē'kĭn), a city in Illinois, county seat of Tazewell County, on the Illinois River, 55 miles north of Springfield. It is on the Illinois Central, the Chicago and Alton, the Atchison, Topeka and Santa Fé, and other railroads. The surrounding country produces grain, hay, and fruits. The principal buildings include the county courthouse, the public library, the high school, and many churches. Among the manufactures are farm implements, flour, hardware, soda water, marble products, yeast, wagons, cigars, and machinery. The public utilities include sanitary sewerage, pavements, waterworks, and street railways. It was settled in 1829 and incorporated in 1850. Population, 1900, 8,420; in 1920, 12,086.

PEKING (pē-kĭng'), or **Pekin,** the capital of the Chinese Empire, in the province of Pe-chi-li, 100 miles northwest of the Gulf of Pe-chi-li. The site is in the center of a sandy plain, about 60 miles south of the great Chinese wall. It is surrounded by walls built of brick and stone laid in cement. Properly it consists of two parts, the northern and the southern. The northern part forms the Tartar city. It is surrounded by a wall 60 feet high, which is 50 feet wide at the base and 40 feet at the top. The southern part is the Chinese city and is inclosed by a wall 30 feet high, 25 feet wide at the base, and 12 feet at the top. It is estimated that the walls surrounding the outer city and suburbs are about 30 miles in length. They are so constructed that fully 25 square miles are inclosed by them. Sixteen gates are provided for entrance into the city, and each is protected by an enceinte and an imposing tower. Within the northern part is the Prohibited City, known as the Kinching, where the palace of the emperor and the buildings of the principal officers are located. This section includes the Tranquil Palace of Heaven in which the emperor resides. Within its confines are the Palace of Earth's Repose and the residence of the empress. Beautiful gardens, magnificent groves, and artificial lakes are in this vicinity. It is at once a place of security and beauty.

The legations of foreign countries, including those of the United States, France, Germany, Russia, and Great Britain, are located in the Tartar city proper. In 1900 the German minister, Baron von Ketteler, was murdered in that portion of the city, and there the United States minister, E. H. Conger, was held captive in 1900 until liberated by the allied forces of the United States and European nations. Peking has many excellent temples and public buildings. Among the more important structures are the Temple of Agriculture, the Mohammedan mosque, the Temple of Eternal Peace, the Imperial Library, the Temple of Heaven, the Grand National College, the Observatory, and the Chinese Medical College. The city has many elementary schools, colleges, and places of worship. As a whole its trade is limited and the manufactures are not extensive. The store buildings are open in front, and are so built that the customers stand on the street when making purchases. Few pavements are in the city, though telephone and telegraph connections are abundant, and a railroad line connects the city with the Gulf of Pe-chi-li and several other important points. Many of the citizens are extremely poor. Residences are not uncommonly mixed with factories, public offices, and temples, and the sanitary regulations in many parts are greatly neglected.

Peking was the capital of the kingdom of Yen many centuries before the Christian era, but when the Tsin dynasty overthrew the king-

dom, in 222 B. C., it ceased to be the seat of government. The Kitan dynasty restored it as the capital in 938 A. D., but Genghis Khan captured it in 1215, though with the conquest of the Mongols, about 1280, it became second to Nanking, and that city was made the capital. Yung-Lo, the third emperor of the Ming dynasty, removed the court to Peking in 1421, and since then it has continued to be the capital. The allied army of the French and English, in 1860, invaded China, when they secured from the emperor the Treaty of Tien-tsin. Subsequently other treaties were concluded whereby legations are allowed to reside in the city, but they are forbidden entrance into the Prohibited City. In 1900 Peking was the scene of vast military disturbances, and was occupied by the allied armies of the United States, Germany, Russia, England, and France under General Waldersee. Population, 1922, 992,865.

PELAGIUS (pē-lā′jĭ-ŭs), founder of the Pelagian religious system, born in Britain about the middle of the 4th century. He was of Welsh origin, studied for holy orders, and later became a monk. He was in high repute for genius, learning, and piety. About the year 400 he went to Rome for the purpose of advocating his views in regard to original sin, and with the design of reforming the clergy and laity. His views were opposed by Saint Augustine, but they were supported by Coelestius and many others. Among the tenets of Pelagianism regarding original sin are the following: The denial of original sin and, consequently, of its remission in baptism; the denial of the necessity of grace; the assertion of complete free will; the possibility of a perfectly sinless man; the existence of a middle state for infants dying unbaptized; the view that Adam's fall injured himself only and not his posterity; and the tenet that neither death nor sin passed upon all mankind by the fall of Adam, since he was created mortal and would have died, even if he had never sinned. The controversy resulting from the views held by Pelagius and Coelestius caused an extended discussion and gave rise to many canons. Pelagius was accused of heresy before the synod of Jerusalem, in 415, but a synod of fifteen bishops acquitted him, while a council of 214 bishops, held in Carthage, condemned his doctrines in nine canons. Coelestius was banished from Rome by the emperor in 415. He was condemned by a synod at Rome in 430 and again by the Council of Ephesus in 431. It is not known when the death of Pelagius occurred. Some contend that he died in Britain, while others think his death occurred in Palestine. Pelagianism long had a foothold in the church, but the followers of Pelagius never formed a distinct sect.

PELASGIANS (pē-lăs′gĭ-ąnz), an ancient and widely distributed tribe of prehistoric people, who are considered the ancestors of the Greeks and of the earliest civilized inhabitants of Asia Minor and Italy. It is not known where or how these people originated, but most writers agree that Arcadia was one of their principal seats, where they prospered for many centuries. Many Greek writers, including Homer, Herodotus, and Aeschylus, speak of them as the Pelasgi and regard them the inhabitants of Greece at a very early period, though Strabo and several others speak of them only as a branch of the early Hellenic inhabitants. Some historians assert that they were a powerful people even before the 15th century B. C., when they were in possession of the northern coast of the Mediterranean. Later they formed an alliance with the Lydians and Achaeans. In the reign of Rameses I. they conquered a portion of Lower Egypt.

PELÉE (pę-lā′), **Mont,** an active volcano in the island of Martinique, near the northwestern shore. The slopes are gradual, but the surface is scarred by many deep ravines and waterways. Formerly it had an elevation of 4,200 feet, but the destructive eruption of 1902 increased the height about 700 feet. Before that time Saint Pierre, located near the base of Mont Pelée, was the chief commercial center, but it was almost totally destroyed at the time of the eruption. It was supposed to be an extinct volcano, as disturbances had not been noticed since about 1850, and in its crater was a lake fully fifty yards in diameter and surrounded by vegetation. The first occurrence of activity became known in April, when clouds of smoke rose from the summit and the temperature grew several degrees warmer, but no serious eruptions took place until May 5th, when mud was thrown from the crater and flooded the sides of the mountain. Three days later the great eruption occurred, which destroyed Saint Pierre and a number of adjacent towns, killing about 30,000 people within a space of ten minutes. In the harbor were eighteen vessels at the time of the eruption and of these only one escaped. The temperature in the vicinity of the volcano was so intense that relief parties could not reach the towns in ruin and, when a landing was effected, it was found that not a living thing remained. However, Saint Pierre was not embedded in lava and ashes, but life was destroyed by poisonous gases and extreme heat.

PELEW ISLANDS (pē-lōō′), a group of islands in the North Pacific Ocean. They are located about 425 miles east of the Philippines and belong to the Caroline Archipelago. The group includes about 25 inhabitable islands, most of which have a rich and fertile soil, an abundance of water, and excellent fisheries. The interior is mountainous. Coral formations encircle the greater number of islands. The climate is healthful and quite favorable to Europeans. Among the productions are cocoanuts, sugar cane, tropical forest trees, cattle, goats, fowls, agricultural products, and

many kinds of fruits. The population consists principally of Polynesians, but several European settlements are maintained, the most flourishing being at Tomil Harbor. Spanish navigators explored the group in 1543, and in 1899 they and all the Carolines, except Guam, were bought by Germany, to which country they now belong. Population, 1922, 6,745.

PELICAN (pĕl'ĭ-kạn), a genus of web-footed water birds, remarkable for their broad bill with a pouch under it. The bill is flattened, nearly straight, and very long. At the end of the upper mandible is a hook curving over the tip of the lower one. In size the bird is about

WHITE PELICAN.

as large as a swan and the feathers are hair-like. The pouch is underneath the lower mandible. It consists of naked skin and serves for the temporary storage of food, thus making it possible to preserve a quantity for future wants. Pelicans are swift in swimming and in flight, and hover over their prey until they can catch it by swooping down unawares. Several species are native to the United States, including the familiar *white pelican*. It is about six feet long, has an expanse of wing of about nine feet, and weighs eighteen pounds. The *brown pelican* is found on the coasts of the Gulf of Mexico and the Caribbean Sea. Several allied species of birds are found in the Old World, including the *common pelican* of Asia and Africa, which is as large as a swan. These birds live along the shores of streams and the seacoast, where they feed on fish and other aquatic animals. Their nests are built close to the shore, usually in rushes, where they feed the young from the pouch. The ancients had a tradition that the young are fed with blood from the breast, and a number of interesting fables have been written on account of it. Pelicans can be domesticated successfully. Negroes and Indians regard their flesh valuable food, but it is rank and has a fishy taste and is not eaten by the whites.

PÉLISSIER (p-lē-syā'), **Aimable Jean Jacques,** noted soldier, born at Maromme, near Rouen, France, Nov. 6, 1794; died in Algiers, May 22, 1864. He was the son of a farmer, studied in the Lyceum at Brussels, and in 1814 entered the French military college, but in the same year became connected with the royal guard. He served consecutively in Spain and Algeria, and in 1850 was made general of division. In 1855 he commanded the first corps in the Crimean War, but soon after succeeded Marshal Canrobert as chief commander. For distinguished service at Malakoff, the strategic point leading to the fall of Sebastopol, he was made Duke of Malakoff and senator, and received a donation of $20,000. In 1858 he was ambassador to London and in the following year was appointed governor general of Algeria.

PELLA (pĕl'lȧ), an ancient city of Macedonia, on the Ludias River, near the present Lake of Janitza. Philip II. made it a town of much importance and in his time it had a population of about 90,000. It gradually declined after its surrender to the Romans in 168 B. C., but at present only a few scattered ruins remain. Pella was the birthplace of Alexander the Great.

PELOPIDAS (pē-lŏp'ĭ-dȧs), an eminent general and statesman of Thebes, a contemporary of Epaminondas. He advocated a democratic form of government, but was driven from Thebes by the oligarchic party and for some time resided at Athens. In 371 B. C. he fought in the Battle of Leuctra. He was sent as ambassador to Alexander of Pherae, but was seized and imprisoned by the tyrant and was afterward rescued by Epaminondas. In 364 B. C. he defeated Alexander of Pherae at Cynoscephalae, in Thessaly, but was slain while in pursuit of the enemy.

PELOPONNESUS (pĕl-ŏ-pŏn-nē'sŭs), the peninsula forming the southern part of Greece, now called the Morea, so named from King Pelops, who made it the seat of a Grecian colony. The peninsula is connected with northern Greece by the Isthmus of Corinth, a narrow neck of land lying between the Saronic Gulf and the Gulf of Corinth. It is about 140 miles from north to south, has an area of 8,975 square miles, and formerly contained a population of 2,000,000, though at present the inhabitants

number only about one-seventh of that number. The principal cities of ancient times were Argos, Mycenae, and Sparta, and in 431-404 B. C. it was the seat of the Peloponnesian War. Anciently it was divided into the six states of Laconia, Sparta, Messenia, Arcadia, Elis, and Argolis. Some writers add a seventh state, Sicyon. A part of the region was conquered by the Turks in the 15th century, and subsequently it was a possession of the Venetians. In 1821 it was the scene of several battles in the Greek war of independence.

PELOPS (pē'lŏps), an important personage of Greek legend, son of the cruel Tantalus, brother of Niobe, and grandson of Zeus. Pelops is described as a pious and virtuous prince. After his father was banished to Tartarus, he entered upon a war against the King of Troy, in which Pelops was defeated and forced to flee. Soon after he emigrated to Greece, where he married Hippodamia, daughter of the King of Elis, and succeeded his father-in-law on the throne. His reign in Pisa is described as one of much splendor, and his colonies in southern Greece caused that region to be called Peloponnesus. He was the father of a number of celebrated Grecians, of whom Thyestes and Atreus are particularly noteworthy. Many of the myths mention him, and he was honored with particular regard at Olympia for having revived the Olympic games. A sanctuary was dedicated to him at Olympia, in the grove Attis.

PELOTAS (pā-lō'tàsh), a city of southern Brazil, in the state of Rio Grande do Sul, on Lake Patos. It is surrounded by a productive stock country and is the seat of a large meat-curing industry. The place has railroad connections with interior towns and seaport cities, and a large market in tallow, bones, hides, horns, merchandise, and utensils. The streets are regularly platted and intersect each other at right angles. It is one of the wealthiest and most beautiful cities in Brazil. Population, 1922, 44,250.

PELVIS (pĕl'vĭs), the portion of the human frame which connects the column of the spine with the lower extremities, serving to transfer the weight of the upper part of the body to the lower limbs. It consists of two main bones known as the *innominates*, into the sockets of which are fitted the thigh bones. The pelvis has an oblique position with regard to the trunk of the body and behind are the *sacrum* and *coccyx*, two bones forming the lower extremity of the vertebral column. Within the pelvis cavity is the lower part of the intestines. The pelvis varies somewhat in the skeleton of the different races, as well as in the male and female.

PEMBA (pĕm'bà), an island off the east coast of Africa, about 30 miles north of Zanzibar. It has an area of 380 square miles. The products include rice, maize, fruits, and sugar cane. For the purpose of government it is connected with Zanzibar, being a part of the dominion of the native sultan, but under the protectorate of the British. Chaka is the chief town. Population, 50,000.

PEMBERTON (pĕm'bĕr-tŭn), **John Clifford,** soldier, born in Philadelphia, Pa., Aug. 10, 1814; died July 13, 1881. He graduated at West Point in 1837 and served as lieutenant against the Seminoles in Florida. At the beginning of the Mexican War he was raised to the rank of a major and as such commanded at the Battle of Molino del Rey. He entered the Confederate service at the beginning of the Civil War, was made major general, and defended Vicksburg against the Federals under General Grant, to whom he surrendered in 1863. The next year he resigned his commission, but later had charge of the artillery defenses of Richmond. After the war he engaged in farming in Virginia, but removed to Pennsylvania in 1876.

PEMBROKE (pĕm'brōk), a city of Ontario, county seat of Renfrew County, on the Ottawa River and the Canadian Pacific Railway, 85 miles northwest of Ottawa. The noteworthy buildings include the high school, the county courthouse, the city hall, and a number of churches. It has a large trade in lumber and merchandise. The manufactures include furniture, lumber products, and machinery. An extension of the Ottawa River, known as Lake Allumette, contains the island of Allumette. Morrison's Island was visited by Champlain in 1633, while exploring the valley of the Ottawa. Population, 1921, 7,875.

PEMMICAN (pĕm'mĭ-kạn), an article of food originally made of buffalo meat by the American Indians. They first cut the lean meat into strips. After drying it in the sun or wind, it was pounded into a paste and tightly pressed to form cakes, which they sometimes flavored with the juice of the Juneberry. A somewhat similar food is now made from beef and dried fruit. It possesses a large per cent. of nourishment in small space and keeps well for a long time. This class of food is used on long voyages or explorations.

PEN, an instrument for writing with a fluid ink, usually made of metal and fitted to a holder. The ancients used pens made from reeds for writing on papyrus or parchment, and reed pens are still in use among the people of Persia and other countries of Western Asia. A pointed stylus of metal, bone, or other material was employed in early times for writing on wood or stone. The peoples using characters like those employed by the Chinese and Japanese write with a hair pencil or brush. With the manufacture of paper suitable for writing pens came into general use, but they were originally made from quills, mostly those of the goose, turkey, swan, crow, and ostrich. The best quill pens are obtained from quills taken from the wings of the goose, and in many